

THE IRON AGE

THURSDAY, NOVEMBER 24, 1892.

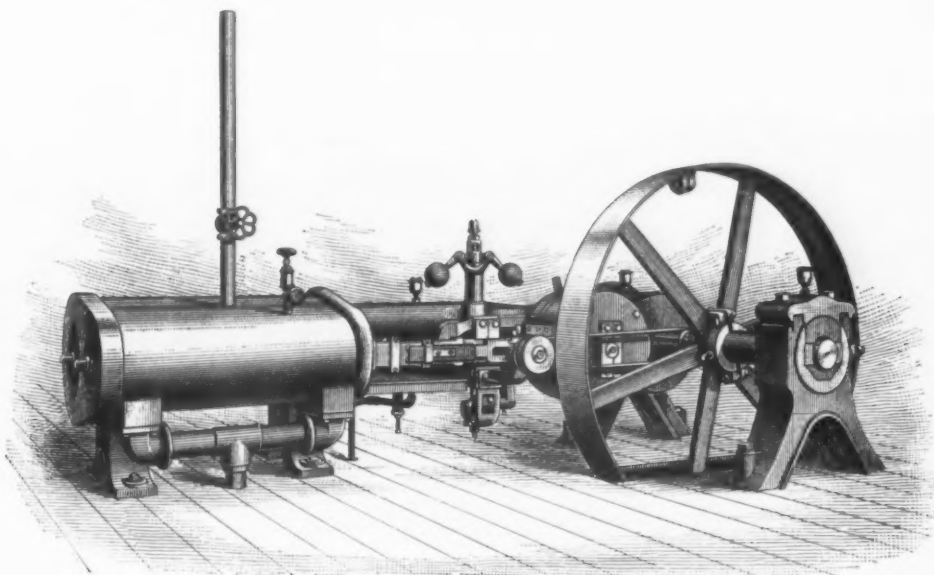
The Waters Engine.

The object sought by Frank J. Waters of Providence, R. I., in designing the valve of which drawings are here presented was to produce an engine in which the steam could be automatically and absolutely cut off from the cylinder when the normal speed was exceeded and the valve ports opened when the speed of the engine was reduced to the normal. Another object was to produce a device by which the drag exercised by the cut off valve controlling mechanism at the starting and stopping of the engine could be obviated. A still further aim was to reduce the friction of the operating parts and to prevent the cramping resulting from the wear of the roller bearings. A good idea of the general form of the en-

raised by a suitable spring supported in a bracket and adjusted by a set screw. When the pressure in the cylinder becomes dangerous, the valve will be forced outward and a small amount of water and steam will escape through the perforation and thence through the exhaust pipe. The valve will be rapidly operated by the pressure of the spring lifted lever to again close this perforation.

The valve casing is provided with a rear passage connecting with the rear end of the cylinder and a forward passage connecting with the forward end of the cylinder, these passages being also connected with the exhaust pipes. At the center of this casing is the steam chest. The slide valve is generally cylindrical in shape, and is free to reciprocate in the bearings formed in the walls separating the steam chest from the two end passages, these bearings

fit the base of the slide valve, and is provided with a tubular valve stem, which passes through the tubular valve stem of the slide valve and through a stuffing box in the bracket *b*, and is secured to the stud *c*, carried by a rod passing through a slot in the valve drive rod. The rear cut-off valve closely fits the bore of the slide valve, and is furnished with perforations to allow the steam to pass through and balance this valve, in the center of which is secured one end of a valve stem, which extends through the slide valve and through a stuffing box formed in the stud *c*. The outer end of this stem is secured to the bent arm of a rod attached to the inner face of the valve rod. The valve drive rod, having the bracket *b*, extends forward and engages with the mechanism for operating the slide valve, having a slot through which the governor drive



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gine and valve gear may be obtained from the perspective view on this page.

Steam is supplied to the engine through the vertical pipe shown leading from the center of the steam chest, the exhaust escaping from each end through the lower pipe. The exhaust pipes, in addition to being connected with the ends of the valve chamber, are also connected with spaces formed in the ends of the cylinder, the rear space, as shown in Fig. 2, being separated from the main portion of the cylinder by a partition, adapted to be broken by any severe pounding of the piston resulting from the accumulation of water in this end of the cylinder, thereby taking up the strain which would otherwise be exerted on the cylinder head. Should this partition be broken, free egress for the water and steam is furnished by the connection with the exhaust pipe. At the forward end of the cylinder and cast in one piece with it is a partition formed with an opening, the outer portion of which forms a seat for a valve provided with a valve stem horizontally movable through the perforation in a plug screwed through the outer forward head of the cylinder. Against the outer end of this stem is pressed the short end of a bell crank lever, pivoted at its angle between lugs provided on the guide box, the long end of the lever being

being packed by means of segmental rings of metal, two rings being used to break the joints and the rings being held in place by flanged sleeves surrounding the slide valve, part of the walls of which are cut away. At the central portion the slide valve has longitudinal slots through which steam passes from the steam chest into the interior of the valve. Between the ends of these slots and the end walls of the slide valve are the outlet ports through which steam is admitted to the passages leading to the cylinder. The left hand end (reference being had to Fig. 2) is closed by a wall beyond which is an extension open at the end and having side ports to allow the exhaust steam to pass from the cylinder into the rear end of the valve casing when the slide valve moves forward. The other end of the valve is provided with an extension serving the same purpose. These extensions move horizontally with the slide valve in metal packed bearings.

The forward end wall of the slide valve has a threaded opening, into which the inner end of a tubular valve stem is secured. This stem passes through a stuffing box, and its outer end is attached to the reciprocating bracket *b*, which forms part of the valve drive rod and has an arm moving in a bearing in a bracket secured to the valve case. The forward cut-off valve is perforated and is formed to closely

shaft *d* extends. The forward and rear cut-off valve rods extend forward and are shaped as shown in Fig. 2.

The valve driving mechanism is contained within a case, as shown in Fig. 6, and is driven from the gear *o* which engages with the gear *m*. In the plate *j* is a semicircular slot, indicated by the dotted lines in Fig. 3, and on its inner surface a recess and a cam ring, *k*, shown in face view in Fig. 4. The shaft carrying this plate also carries a similar one, arranged as shown in Figs. 2 and 6. This latter plate has a cam, *l*, a central recess and a semicircular slot. The cams *k* *l* have a corresponding throw and return and are engaged by the roller bearings of the valve drive rod. The revolution of these plates will, therefore, cause a reciprocating motion to be imparted to the slide valve. In the outer surface of the cam plate *j* is a circular recess to receive a plate formed with a cam ring shaped as shown in Fig. 5. This cam operates the rear cut-off valve to wholly or partially open or close the ports of the slide valve. A similar cam ring carried by the plate *l* operates the forward cut-off valve. The central portion of the shaft carrying these plates has a transverse slot, Fig. 7, in which a rack, operated by a rod in a central longitudinal opening in the shaft, is free to move longitudinally. In this opening is

the gearing shown in Fig. 4 and to the right in Fig. 7. When the rack is operated it will turn the cam plates actuating the valve rods, as shown in Fig. 2. To the inner end of the rod attached to the rack is pivoted an arm secured by a pivoted link to the shifting arm of the regulator mechanism.

On the shaft shown in Fig. 6 and to the extreme right in Fig. 2 is clamped a ring in which the ends of levers are pivoted. The other ends of these levers are pivoted to weights, connected to which are the ends of other levers leading to studs on a sleeve, the outer end of which is provided with a grooved sleeve pulley. Between the ring and sleeve is placed a spring, the coils of which encircle the shaft, and which tends to draw the weights toward the shaft. The lever *q* is provided with a stud which enters the groove in the pulley. The other end of this lever is secured to the link *p*, whose other end is forked and formed with studs. Secured to the inner end of the shaft carrying the rack is a beveled gear, *g*, meshing with which is the horizontal gear *h*, which in turn engages the gear *f*. Motion being im-

As the speed of the shaft is increased, the weights will be driven in a larger radius and will draw the ends of the pivoted arms together, also drawing the grooved pulley against the force of the spring. The connected ends of the levers will also be drawn in that direction, and the clutch block engaged between the studs of the lever *p* will move the clutch into contact with the cavity of the gear *f*. The clutch block will be rotated by this gear in a direction to advance the tube by the engagement of its nut with the interior of the sleeve in a direction indicated by the upper arrow in Fig. 7, moving the rack in the same direction and operating the cut-off cams, as above described. When the speed of the engine falls below the normal, the clutch will be moved by the pivoted arms and their connecting mechanism into contact with the cavity of the gear *g*, which, traveling in a direction opposite to that of the other, will also turn the clutch and the sleeve in this direction, and by the engagement of the nut with the threaded interior surface of the sleeve will drive the tube and the rod operating the rack in the direction indicated by the

Pittsburgh Smoke.

Last spring a special committee of the Engineers' Society of Western Pennsylvania appointed a committee to consider the smoke question, the chairman being T. P. Roberts, and the members, W. L. Scaife, Charles Hyde, Prof. John Langley, Daniel Ashworth, T. N. Johnston and A. E. Hunt. This committee has just presented its report at a meeting held in Pittsburgh. We take from it the following paragraphs:

If we could always have a flame playing over all portions of the top of a fire, and at the same time an ample supply of hot air thoroughly mixed with the fuel gases, there would never be any notable quantity of either yellow or black smoke passing up the chimney. Theoretically the complete abolition of smoke can be secured by having a top flame and a top supply of hot air, but just here is where the practical difficulties begin; for however ample may be the admission of air to the ash-pit, and however well cleared may be the surface of the grate bars, the passage of air

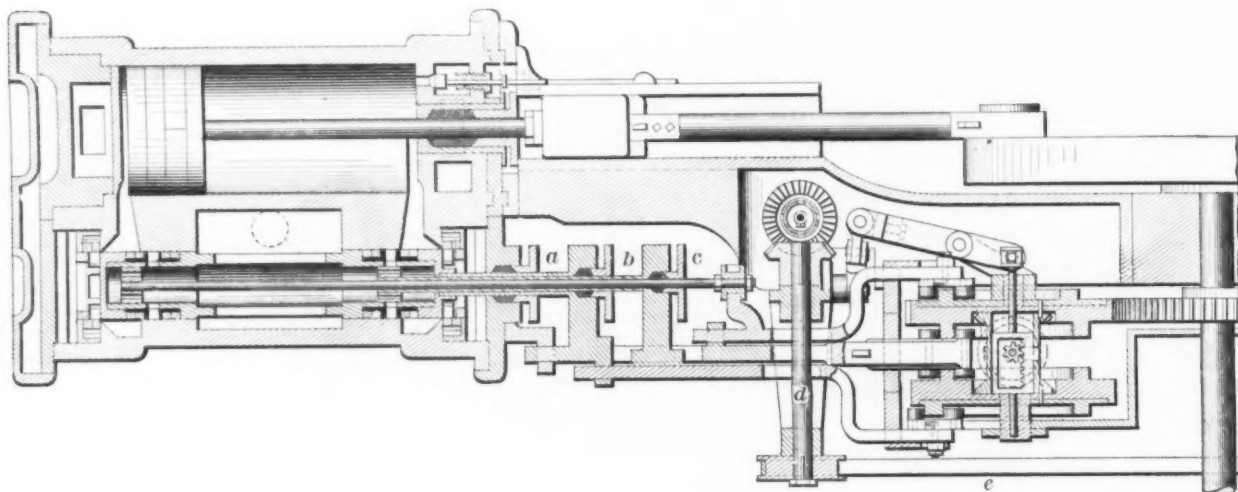


Fig. 2.—Sectional Plan.

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parted to the gear *g* in one direction by the shaft will be transmitted by the gear *h*, to rotate the gear *f* in the opposite direction. Contained between the gears *g* *f* and capable of slight longitudinal movement is a tubular block having a central circumferential groove adapted to be engaged by the studs of the lever *p*. The ends of this block are slightly tapered, as shown in Fig. 7, formed by clutch blocks adapted to engage the cavities formed in the gears. Journaled at one end in the bearing of the bracket extension is a sleeve which extends partially through the tubular portion of the clutch block and is keyed to it in a manner to allow of the independent longitudinal movement of the clutch block, but to prevent any independent rotation of either this block or sleeve. The interior surface of the sleeve is screw-threaded for a portion of its length, and engaging with this thread is a nut formed on the exterior surface of a square tube moving in a square bearing, one end of which is provided with a flange slightly larger than the bore of the clutch block and bearing against the end marked *q*, the other end of this tube bearing against a plate secured to the end of a rod which extends through the tube and is secured to the end of the rack-operating rod, having at this end a circumferential shoulder against which the flange bears.

lower arrow *y*, the cut-off valve cams being operated accordingly.

When the steam is shut off from the engine the speed of the shafts carrying the weights will gradually diminish; but before the shaft stops the tube will be driven in the direction indicated by the lower arrow until the flange engages the end of the clutch block and draws it out of engagement with the cavity of the gear *g*, preventing drag on the engine when starting.

This engine is being placed on the market by Howe & Waters of Providence, R. I.

The National Wagon Makers' Association held its annual meeting at the Wellington Hotel, Chicago, on the 16th inst., and concluded with a banquet in the evening. The following officers were chosen: President, C. Hotz, Chicago; vice-presidents, W. T. Lewis, Racine, Wis., and W. C. Nones, Louisville; secretary, H. M. Kinney, Winona, Minn.; treasurer, M. Rosenfield, Moline, Ill. A resolution was passed determining to help the movement for good roads and instructing the secretary to take such action as was best calculated to carry out the wishes of the meeting. Clem Studebaker of South Bend, Ind., the retiring president, occupied the chair at the banquet.

through 4 or 5 inches of incandescent fuel completely deprives it of free oxygen, so, that there is none available to ignite the freshly charged coal.

But air admitted simply through slits in the fire door, while helping to keep up a top flame, yet being cold and imperfectly distributed, will chill some portions of the fuel gases below the igniting point, and consequently imperfect combustion, with the production of black smoke, will result. Hence, an essential requirement of devices for smoke prevention is an ample, timely and thorough mixture of air with the combustible gases distilling from the fuel.

The style of furnace known as the "regenerative" is the best known plan for preheating the air which is to be supplied to the fuel through the air door. It, however, is not suited for boilers and for many other applications of fuel. The former are probably the greatest smoke producers in Pittsburgh and Allegheny and are daily becoming more numerous, owing to the increasing use of steam for elevators, heating, lighting and power in buildings throughout these cities. Much of their smoke is due to badly constructed furnaces and to the fact that the boiler capacity is insufficient to properly fulfill the duty required of them.

In order to preheat the top air before it reaches the fuel gases it is sometimes ad-

mitted through openings in the brick work at the side of the fire, or through slits in the fire bridge. This is a partial remedy only, because the air is rarely sufficiently heated or mixed thoroughly enough with the distilling products of the coal.

Boilers Must Not Be Crowded.

These are mechanical arrangements, more or less complicated and costly, de-

slowly means that a boiler must not be crowded. Hence the use of a mechanical stoker, and the suppression of smoke may mean an increase of the number of boilers to do the work formerly done under hand-stoking with the generation of smoke.

Mechanical stokers are especially adapted for large plants where they can be so arranged as to displace manual stoking. Their cost will prevent their adop-

ers. On of their advantages is that an inferior fuel can be successfully burned by them.

There are in use a number of devices by which jets of steam are arranged to force currents of air above or below the fire. They are simply in construction, inexpensive in first cost and repairs, require very little space and can be readily applied to existing furnaces. The best of them, even

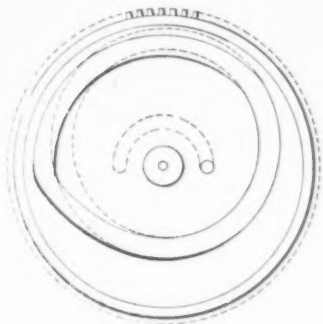


Fig. 3.—Face View of Valve Controlling Cam Mechanism.

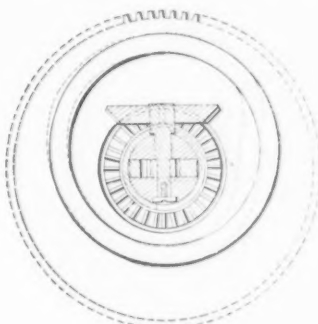


Fig. 4.—Section through Fig. 3.

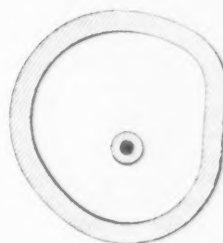


Fig. 5.—Sectional View of Cam Controlling Rear Cut-Off Valve.

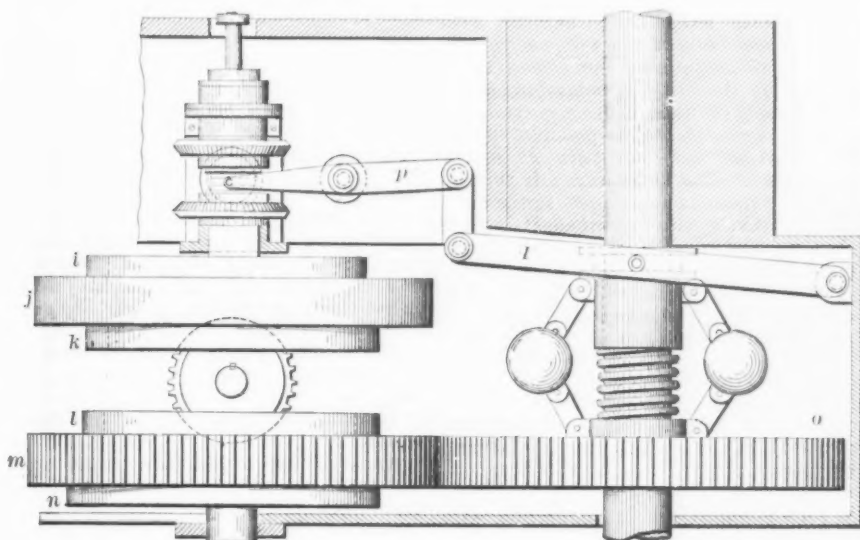


Fig. 6.—Top View of Cam Motions.

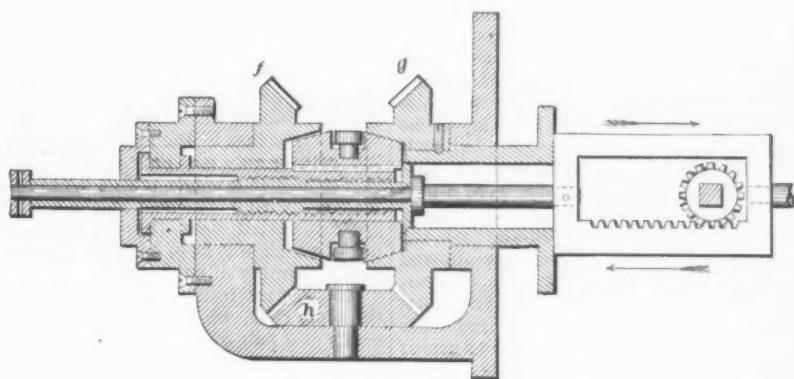


Fig. 7.—Longitudinal Section of Cam Shifting Device.

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signed to supply the fuel, not intermittently but constantly, and to spread it in thin layers over the fire. There are several very good stokers now on the market which accomplish the desired result with greater or less success, according as they are permitted to feed the coal slowly or rapidly. If the feeding is made slow enough the suppression of smoke may be theoretically complete. But to feed

tion in many small plants, although here and elsewhere numbers have been applied to single boilers. Where either vertical or horizontal space is restricted, it is sometimes impossible to apply mechanical stokers. Like all plans of successful firing, they require intelligent manipulation or they will smoke and give trouble. Pittsburgh coal, in the form of nut or slack, is well adapted for automatic stok-

when slack is used, can reduce to an almost invisible vapor, in less than half a minute, dense black smoke from a boiler.

The Use of Steam Jets.

One of the most varied and successful applications of steam jets may be seen at a well-known mill in this city. After several years of use of natural gas, the owners were forced to return to coal. They found, however, that with coal their boilers would not supply sufficient steam. Accordingly, they concluded to try steam jets to increase combustion and evaporation. After some experimenting they finally adopted a jet somewhat of the Bunsen burner type, which is now in successful operation on two batteries of flue boilers—the jets being placed above the fire doors and immediately below the boilers. The fuel is slack, and yet almost no smoke is visible, even during heavy firing. The same firm have also applied to 18 puddling and four heating furnaces steam jets of a different design. In these the ash pit is made tight and the steam and air enter below the grates. These furnaces are of the usual type, except that special openings are made for air above the fire and through the bridge wall. When the fire doors are closed no black smoke is visible while the steam jets are in operation. The smoke appears above the stack whenever the fire door is opened, but disappears immediately on closing the door. Each puddling furnace has two jets of steam and each heating furnace five jets, all about $\frac{1}{8}$ inch in diameter. Nut coal can now be used in the heating furnaces and slack in the puddling furnaces, whereas lump was used formerly in both. The jets have been in use for nearly a year, and the mill owners state that they have not injured the boilers, nor the furnaces, nor the iron, but have saved money by reducing the quantity and quality of the fuel required. Unfortunately the steam jet makes a great noise. This is not very objectionable in a rolling mill or machine shop, but will probably prevent its introduction into office buildings, where otherwise it might be useful.

Objections to Lima Oil.

Lima oil is at present used in various kinds of furnaces, being fed into the combustion chambers by means of air under considerable pressure. It makes an easily regulated, smokeless fire, but has not received much application in Pittsburgh owing to its cost being equal to or greater than coal. Its disagreeable odor is also an objectionable feature. Electricity is pro-

posed for heating purposes, but at present it finds little or no application here.

Every city has its peculiar needs and activities which must be recognized in attempting to apply to it general results applicable elsewhere. Of no city is this more true than of Pittsburgh, with its varied industries, its natural resources and enormous production. Hitherto smoke has been the black ensign of the ceaseless warfare carried on here with the forces and materials of nature.

It is estimated that before the introduction of natural gas Pittsburgh consumed about 10,000 tons of coal daily and that the present consumption is about 7000 tons. In Pittsburgh and Allegheny about 25,000 houses are still supplied with natural gas, amounting to several hundreds of millions of cubic feet daily, and probably representing more than half the present coal consumption.

If, therefore, our skies are darkened now, what may we expect when the present almost smokeless natural gas fires become smoke producers? Our finest residence district, the East End, will especially suffer by the change. Already, owing to the peculiar topography of Pittsburgh, and in spite of the special smoke ordinance recently passed, the East End is often covered by clouds of smoke, mostly produced in the lower parts of the city. Of the 10,000 houses probably occupying the district, it is estimated that four-fifths use natural gas at present.

Black Prospect for the Future.

Were the latter to return to coal and the manufactories to their former smoke emission, we can readily imagine the increased blackness of the skies. Allegheny would likewise suffer, though possibly to a less extent. We must confess that up to the present time, outside of coke or a gaseous fuel, there has appeared no practical solution of the smoke problem in dwellings, although with a return to soft coal they will increase the quantity of smoke as the city grows.

Steam boilers are probably the principal cause of smoke in the city. But there appears to be no reason why they should not be rendered almost smokeless except for a few minutes daily. As many are put in buildings erected in the heart of the city, where their fires emit dense volumes of smoke, because no adequate provision has been made by the architects or builders for proper stoking apparatus, furnaces or flues, we believe that building inspectors should in the future be instructed to see that the needs of smokeless combustion have been attended to, at least in so far as sufficient flue and furnace space are concerned.

Locomotives and steamboats are important smoke producers here. The latter have furnaces which can be treated like those of ordinary stationary boilers. Hence their smoke can be abated readily.

What Can Be Done.

We cannot hope to free our city from all the smoke now poured from stacks and chimneys. But it is within the range of present possibilities to abate the greater part of the nuisance. To this end we would recommend that the Women's Health Protective Association or some similar organization continue their efforts toward smoke prevention by educating the community in its principles and advocating the use of smokeless fuels in dwellings, and the best stokers or other devices in manufactories and steam plants; that our City Councils should pass an ordinance for the abatement of the smoke nuisance, insisting on the absence of dense smoke from stationary, steamboat and locomotive boilers, except when fires are started, but recognizing the necessities of puddling and other furnaces which require a small ex-

cess of carbon for proper working; that one of the duties of building inspectors or of persons appointed for the purpose should be to see that newly erected buildings have properly designed flues and furnaces with particular reference to economical combustion and the non-emission of smoke.

Failures in the Necks of Chilled Iron Rolls.*

BY CHARLES A. WINDER, SHEFFIELD.

Many methods have been tried to improve the working qualities of the rolls, and there is still very much to be accomplished; but the only real improvement that has yet been successfully carried into effect is that of keeping the rolls cool by a copious supply of tepid water, without which it would be impossible to prevent disaster owing to the quick succession of hot blooms, which is nearly equal to the effect of a furnace. When we consider that the output for one pair of rolls was formerly only about 150 tons per week, and now is from 900 to 1000 tons, it is obvious that some provision must be made to accomplish the extra work. In many sheet mills, indeed, there are no means whereby the temperature may be kept down in the body of the roll, which rises to that of oxidation; but although the cooling of the body is not attempted, a good supply of water is often provided to keep the necks as cool as possible, so that the lubricant may not burn off or the brasses cut. The consequence is that an unequal expansion takes place in the body and the neck, and though the effect does not show itself at once, yet a weakening process has been set up which will eventually shorten the life of the roll, for a failure is certain sooner or later to take place, if not provided against by a suitable design. By careful consideration the temperature of the roll may be gradually reduced so that the atoms of the iron at the junction of the body and neck of the roll are not subjected to a disturbing or disorganizing influence.

Some years ago my attention was drawn to certain difficulties in connection with the chilled rolls used in the tin-plate trade in South Wales, and what made the matter difficult to solve was the fact that while most of our friends down there were well satisfied with the rolls in every way, a few were a source of great trouble. Now the material of which the rolls were made was identical in each case, and the work they had to do was in all cases the same, but the results were extremely variable. Having suspicions that the fault lay in the design, drawings were prepared of all rolls sent into that district, which showed that those which were satisfactory were different in design to those that failed during their work, and the appearances of the fracture in the broken roll clearly showed the temperature of the neck and the roll to have been quite different. The metal of the body had turned a dark blue color owing to oxidation, and the fracture of the neck had remained perfectly bright, having, however, a ragged appearance, the metal in many cases hanging away from the face of the fracture as though torn away by great force.

Now it is worthy of note that all chilled rolls used in this branch of trade for hot rolling require to have an abnormally large diameter of necks; for instance, a roll having a diameter of 19 inches is never safe unless it has a neck of 14 inches diameter; but a similar roll for cold rolling is perfectly safe with a neck having a diameter of only 12 inches—in fact, a breakage has not at any time been reported to

me; yet the pressure upon the bearings is considered to be equal in both cases, so that the only conclusion one can draw is that the weakness has been caused in the hot roll by the unequal expansion of the body and the neck.

A very interesting visit was made to a tin-plate works some time ago, where the rolls were certainly designed with some degree of care and judgment, as shown in Fig. 1, and from inquiries made the result was quite equal to expectations. On reference to the drawing, you will notice that the necks are much under the usual proportion for tin-plate hot rolls, and the diameter of the body is about the same; notwithstanding which, broken necks are almost unknown in this mill.

Fig. 9 is a cold roll working in the same mill and giving very satisfactory results, notwithstanding the fact that it has no radii at the root of the neck.

About the same time similar visits were made to other tin-plate works, where the rolls were made as shown in Fig. 2, and much valuable property was found lying on the scrap heap. Now, had these rolls all been made by some inexperienced iron founder, it might not have been so significant, but an examination of the names upon the tenons showed that they had been manufactured by various makers who have the reputation for doing good work.

Other visits were made to iron works in a different district, and the same results were shown, but in a much larger degree, as the rolls were some six or seven times the weight, and, as in case of the tin-plate rolls, the fracture was precisely the same as shown in Fig. 3, and indicated by the line A B.

Some time ago a report was given in one of the iron trade journals of a bankruptcy case, near Birmingham, when the bankrupt stated one of the causes of his failure to have been loss by broken rolls, and gave an estimate of £2600 for that item. Being unaware of the nature of the breakages, and having had nothing to do with this particular house, I can only conclude that there must have been a want of care somewhere.

An application was made to me some few years ago to supply a set of three-grain rolls for cogging down billets for wire rods. It was pointed out by my friends that they had tried many roll-makers, but the result was always the same, and the neck at the leading gate end always came off after a certain period of work. It is not, therefore, surprising that a similar result happened in my own case. At the time the actual cause appeared to be unaccountable, but the experience that has been gained since then convinces me that the failure was entirely due to the unequal expansion of the neck and body, for the leading gate was very close to the end of the roll (a mistake that is often made), thereby causing the end of the roll to be greatly heated near the junction of the neck, which was kept cool by means of a copious supply of cold water.

Another interesting case occurred about the same time, when the diameter of the necks of a pair of chilled rolls was reduced to save power; the area of the bearings was maintained, and the result up to a certain time was so satisfactory that the proprietor of the mill decided to adopt the smaller necks in the future, thinking he had given the rolls a fair trial after having run them about a month or five weeks. It was found, however, that we had been a little hasty in drawing our conclusions, and our plans were seriously interrupted by the necks breaking off. On examination the fracture displayed a dark ring, which subsequent experience proved to be the result of an unequal expansion of the body and the neck, although at first it was put down to a faulty casting, having that appearance. Had it been so, however, a failure would have taken place much earlier.

* From a paper read before the Iron and Steel Institute.

Evidently a rupture was set up on the periphery of the neck, and by frequent heating and cooling the molecular construction was disturbed, which caused the fracture to travel toward the center until the remaining portion became too small to resist the work put upon it. It is a source of regret that, owing to the death of the owner of the mill, the new design was never tried.

Continental mill owners do not appear to suffer from the failure of roll necks so much as some of our mills at home; but there are two good reasons to account for that fact. The first is they adopt a modified design of roll, as shown in Fig. 4, which is a roll belonging to a French house, and in Fig. 5, which is working in Belgium; but the difference of design in Fig. 4 is not sufficient to account for the

gradually, thereby allowing the neck to be kept cool without the fear of causing a movement of the molecules of the iron at the junction of the neck and body. This really is the duty performed by the large radii. Although it is by some used only as an extended area to give greater strength to resist the pressure upon the necks during the time the rolls are at work, yet it appears to be unnecessary and productive only of evil. Of course, in estimating the breaking strains of the rolls as shown in Fig. 6, we must take into consideration the torsional strain and the resistance offered by the steel or other material that is being rolled as well; but as there are no data in my possession to work upon, probably the members present, many of whom are in daily contact with the work, may assist me. Very much, of

the barrel, so that the temperature may not be so great at the junction of the neck and body, the roll having comparatively small radii; it has also a set-off at the end of the neck to which the tenon is attached, so that the strain in cooling in the sand is not so great as it otherwise would be when the two parts of the casting are so disproportionate.

Fig. 4 shows the same roll under conditions which are a fair sample of many others.

Before closing my paper, and in order to substantiate my views upon this question, let me ask you to consider that the failure of the necks of chilled-plate rolls often takes place after a considerable period of working—only sometimes they occur soon after being put to work; but as the failure in those cases is attributable to some

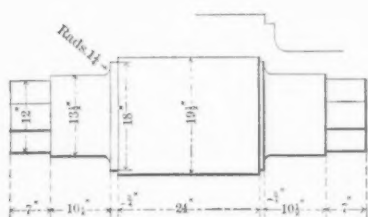


Fig. 1.

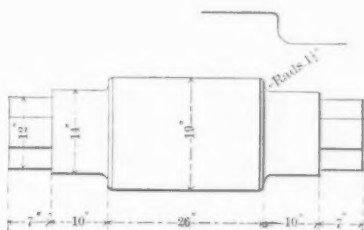


Fig. 2.

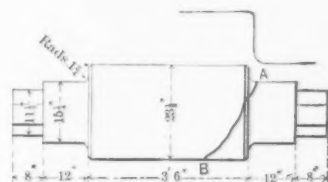


Fig. 3.

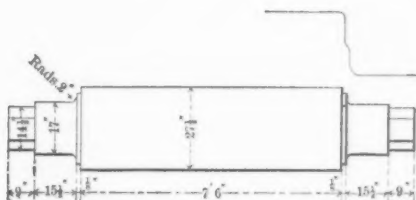


Fig. 4.

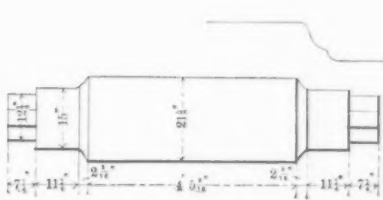


Fig. 5.

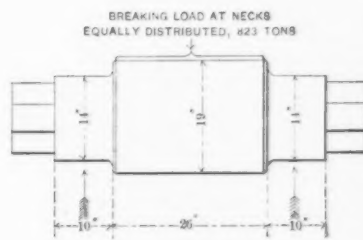


Fig. 6.

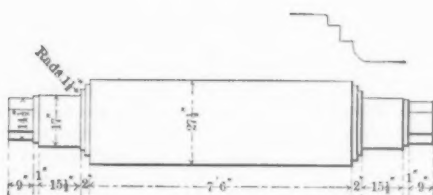


Fig. 7.

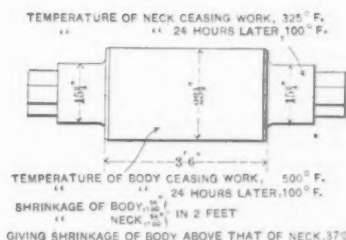


Fig. 8.

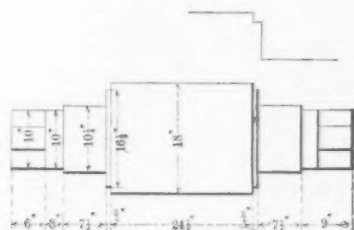


Fig. 9.

FAILURES IN THE NECKS OF CHILLED IRON ROLLS.

difference of result. It may be that we in England make our rolls do much more work than they do on the Continent. This, indeed, is very probable. In the event of a breakage of a roll, the radii and diameter of necks are often looked upon as the sole cause of mischief, and consequently they are in many cases increased to meet the required need. Trouble of this kind has been overcome by these means; but it appears to me that it is a very unscientific mode of procedure, and that bringing the neck up toward the diameter of the body is assisting to bring about another evil and conducting the heat to a place where it is not wanted, the longitudinal cracks upon the face of the necks being evidence of overheating; it also considerably increases the friction, particularly if the necks burn off the lubricant. Larger radii, without increasing the diameter of the neck, are not so serious. The design approaches Fig. 7, and reduces the diameter and temperature

course, depends upon the material, the temperature and the draft; but it appears to me that the necessary pressure required to reduce steel at the heat at which it is usually worked is much below that of the breaking strains of the roll.

Fig. 8 gives the behavior of the roll during work, and we may form some idea of the strain at the junction of the neck and the body by the difference of the temperature and dimensions at the different parts of the roll, which have been carefully noted by means of a micrometer. The tests were made immediately after the roll ceased work on a Saturday, and before commencing work on Monday morning.

Many more interesting cases might be brought forward, but they would only be a repetition of those already given, and are as well known to many gentlemen here as to myself.

Fig. 7 is a design for a chilled-plate roll, which has been reduced at the end of

specific cause other than that which we have before us, we must leave them out of our consideration. Taking the generality of rolls which may have worked two, three or more months, the fact that they have worked so long sufficiently proves that they are strong enough to resist the strains put upon them in the process of rolling, as long as the molecular construction of the metal at the junction of the neck and body is not disturbed; but at every heating and cooling, and also during the time they are at tension, as is the case in an unequal expansion, every vibration of the mill is assisting, though in a very slight degree, to cause a rupture which must eventually end in the failure of the roll neck and serious loss to all concerned.

Extensive coal mines at Fuente, Mexico, have been purchased by C. P. Huntington of the Southern Pacific Railroad Company for \$500,000.

Development in Electric Metal Working.*

BY FREDERICK P. ROYCE, BOSTON.

The art of working metals by electricity, the invention of Prof. Elihu Thomson, embraces the various operations of welding, brazing, shaping, forming and tempering; but the department of work in which carriage and wagon manufacturers are specially interested is that of electric welding, and while it may not be best at this time to enter into a thorough technical discussion of the subject, still there are a few fundamental principles which may be interesting, and which will now be detailed briefly.

The Electric Welding Process.

To heat a piece of metal by electricity, the method in practical use is to pass an electrical current having an enormous volume through the piece to be heated. Similarly, if we desire to weld two pieces of metal by electricity, we force through the pieces a current having a volume so great that the metal, on account of its resistance, cannot carry it without rapidly inducing heat.

In case the current is forced through the continuous piece of metal, the heat produced is equal throughout; but if we pass the same current through the two pieces of metal touching each other, the resistance is greatest at the point where the two pieces touch, and the heat is necessarily produced there first.

Two pieces of metal cannot be brought so closely together that the resistance at the point of contact will be as low as in the solid metal; consequently, the heat is necessarily first produced at this point, and after it is once generated the resistance at this heated point increases, for the reason that hot metal is always a poorer conductor of electricity than cold metal. It is consequently a building process. The ratio of increase of resistance and the increase of heat at the desired point become practically constant. When the metal reaches the desired welding temperature the pieces are forced together by end pressure, and a butt weld is made. This pressure for small sizes of work is supplied by various forms of hand levers, but in larger welding hydraulic pressure is ordinarily used, the hydraulic cylinders for the purpose being a part of, and attached to, the welding machine. The result of this end pressure is an enlargement or upset of the metal at the point of contact, the size of the upset depending upon the section of the stock welded. This may be removed in various ways, as will be hereafter described.

There are two distinct types of electric welding apparatus for producing the above results. The first machines built were planned for what is known as the direct method of welding; those built later and in more general use to-day are of the indirect type and specially used for larger work. In the former the dynamo and welding apparatus are combined in one machine, the current passing directly from the collector rings of the generator to the piece to be welded.

In the indirect type, the dynamo and welder are separate pieces of apparatus. The dynamo is complete in itself, and can be located near the source of power, connected by wires carrying the current generated to the welder, which can be placed in any convenient location for the work to be done, and at a distance of several hundred feet from the dynamo, if necessary. This makes it possible to place the dynamo or generator in an engine room or near the source of power and in charge of

the engineer, so that it can be cared for at little or no extra expense. One or more welders can be distributed through the works, and in localities where there may be no arrangements for power, but where they can be conveniently operated, several welders can be run from one dynamo; and there are already instances where five, six or more welders are placed in different buildings and on different floors, running constantly from a common dynamo and fed from a never-varying pressure.

The direct apparatus above referred to is found to be advantageous for small work, as the welding of wire, cotton ties, rims for baby-carriage wheels, &c., and where cleanliness at the point of welding can be observed. For all larger work, however, the indirect apparatus is far preferable.

The dynamo is of special construction, and varies materially from that used for lighting purposes, and yet can be so built, if desired, as to furnish current for incandescent lamps needed in the works where the welding plant is placed. The dynamo generates an alternating current of 300 volts, which is less than one-third of that required for the lowest potential primary circuits used for lighting purposes, where an alternating current is generated.

The welder itself consists chiefly of a transformer or converter, in which the current of electricity generated in the dynamo is changed from one having a reasonably high electro-motive force and varying volume to one having a very low electro-motive force and an exceedingly large volume. This converted current is carried through an electrical circuit made up preferably of massive copper and the pieces which are to be heated for welding. That is to say, we have a circuit which is made up of several feet of heavy copper and a few inches of iron, steel or other metal to be welded, in which the voltage is so low that no shock can possibly be given the operator and no danger whatever can result therefrom.

The power of conducting electricity which the copper possesses is so high that practically no heat is caused in this metal by the electrical current passing through it, but as the current passes through that part of the circuit consisting of the pieces to be welded the resistance through these pieces is so high that a welding heat at the point of junction is quickly secured. This heat is perfectly and absolutely regulated by reactive coils and other forms of apparatus. The work is never hidden from the operator, as is necessarily the case in a forge fire; the necessary pressure can be applied at exactly the right moment, and uniformly good results are obtained. No detrimental foreign matter can be introduced into the weld, as is frequently the case when coal or coke are used, and any impure substance existing in the metal in the immediate vicinity of the weld is ordinarily expelled by this welding process. To illustrate this it has been frequently shown that if a piece of iron, after being electrically welded, is ground or planed off and etched with acids, the structure of the metal at or near the weld will be closer and finer than in the original bar, and thorough and exhaustive tests made upon the welds show that an absolutely perfect union has taken place. The metal becomes homogeneous at the point of welding.

Metal Working by the Use of the Arc.

The Thomson electric welding method, which has been thus briefly described, sometimes called the incandescent process, is now in quite general use throughout the country. It is totally different from what is known as the arc process, and should always be distinguished from it. By the arc method, invented by De Meritens, a current of comparatively high voltage is used, one ter-

minial of the generator or other source of current being attached to the metal to be acted upon, and a portable carbon pencil forming the other electrode. This pencil is brought in contact with the work at any desired point, establishing the arc, which is maintained until the required heating effect is produced. The temperature of the electric arc is greater than any other known source of heat, and its application to metal working is destined to play an important part in the manipulation of metal in the near future.

Development in Electrical Metal Working.

In the year 1888 the electric welding process was first practically applied to commercial work. Machines were rapidly built for various purposes, and welding plants were soon established in various large works throughout the country for a great variety of purposes.

Iron, steel, copper or brass wire of various sizes are united into long lengths; rods and bars of iron or steel are welded, shaped and forged by electrical heat; axles, tires, small parts of carriage and wagon work are turned out in large and rapidly increasing quantities; tubes of iron or steel are welded together in lengths of several hundred feet, and bent into spirals or oblong coils of sizes and shapes required; parts of bicycles are brazed or welded, as the case may be; iron agricultural wheels are welded spoke to hub and spoke upset to tire; fine grades of tool steel, as Musket or Jessop's, are welded to machine steel, forming tool blanks, which may be used with great economy in all machine shops; lead composition plates are electrically connected for storage battery purposes; forgings of 10 square inches of section are heated by the welding process and united by enormous hydraulic pressure; ship stanchions, rods and shaftings are easily welded by powerful machines in our different navy yards, and the field is rapidly broadening for a greater variety of work and with most satisfactory results. The newly developed methods of producing aluminum and the consequent decrease in its cost, promises to open a wide field for this process, as the metal can be welded easily and as quickly as either steel or iron.

Special machines have been necessarily built adapted to the requirements of these different grades of work. The conditions are constantly changing, and welders varying from 50 pounds weight to that of several tons are built as called for to meet the demand from various sources. At the works of the Johnson Company at Johnstown, Pa., several hundred large welds in connection with their various forms of roadbed construction are made daily. There 10 square inches of steel or iron are easily welded together, a pressure of 150 tons being supplied by heavy hydraulic appliances, to reduce the burr or upset and finish the metal. The complete welders are installed at their works, five of them for rail work alone, and weighing upward of 30 tons each.

The leading carriage and wagon manufacturers were first in the field, and among those who then became interested in welding by electricity were Studebaker Bros. Mfg. Company of South Bend, Ind.; Haydock Bros. of St. Louis, Mo.; the Parry Mfg. Company of Indianapolis, Ind.; the Racine Wagon and Carriage Company of Racine, Wis., and the Kentucky Wagon Mfg. Company of Louisville, Ky. They investigated the process thoroughly, and electric welding machines are now in active and successful operation in their shops. The Cleveland Axle Mfg. Company of Cleveland, Ohio, the Sheldon Axle Company of Wilkesbarre, Pa., and the M. Seward & Son Company, of New Haven, Conn., were also among the first to install apparatus.

* Read at the Buffalo Convention of the Carriage Builders' National Association.

Comparisons of Cost of Electric and Forge Welding.

Inquiries are constantly made as to the cost of electric welding in comparison with that of the older forge methods, and it is to this important matter that it is desirable to give special attention in this paper. There are two important elements that enter into the cost of welding: the labor required at the welder and the necessary power to drive the dynamo.

Regarding the labor, an engineer, always employed in carriage and wagon factories, can easily attend to the running of the dynamo. The machine is simple in its construction, it requires but very little care; it must be properly oiled, the brushes and collector rings kept clean, but beyond that needs little or no attention. One man only is needed to operate the welder, where the pieces to be united are of regular shape, and the weight is such that they can be easily handled. In case great rapidity of work is essential, an assistant, generally a boy, will be the only additional helper required to facilitate the handling of stock.

In the case of axle work, two men are generally needed, a blacksmith to do the welding and a helper in reducing the burr or upset under hammer and in setting the axle, turning out easily 150 sets of 1-inch axles, or 100 sets of $1\frac{1}{2}$ -inch axles, as the case may be. In case of light iron buggy tires, one man can easily weld from 700 to 800 daily with a helper, at low wages, to bring the stock to the machine and take it away. In the case of steel tires, 400 to 500 can be similarly welded. On heavy wagon tires somewhat more help is needed. At the Studebaker Works two heavy tire welders are placed side by side, with a hammer conveniently located, and a force of five men turn out a large product daily. The smaller parts of carriage and wagon work are easily managed by a single operator. Fifth wheels, step irons, carriage rails, dash irons and other similar classes of work are turned out with great rapidity.

The removal of the upset or burr at the point of welding is of course an element of cost, and can be removed in a variety of ways. Grinding was at first tried, but this was found to be too slow and expensive in connection with wagon work. Rolling was also attempted, but found to be impracticable commercially. Hammering has been found to be the cheapest and most effective method so far tried. All welds retain sufficient heat after they are removed from the welding machine to be hammered as much as may be required. Not only does the hammering reduce the burr to the size of the metal, but materially strengthens and improves the weld.

Various hammers have been designed working directly in connection with the welding machine, but with wagon and carriage work the ordinary light power hammer is found to be most efficient. Either power or hydraulic presses have been found to be efficient in some varieties of work.

When welding apparatus was first introduced into carriage works, the cost of preparation of the parts to be welded was quite an item of expense. It was at that time thought best to remove all forms of oxide which might have accumulated on the steel or iron, but as this required both time and labor, it was speedily abandoned and it was decided to be more economical to increase somewhat the force of the current used for the welding, even at the expense of additional power required, and no preparation of the metal is now regarded necessary, as far as the ordinary oxide formed by the rolling of metal bars is concerned. Should there be a heavy red oxide, or serious accumulation of foreign matter, it is best to remove this before the weld is made. It is frequently done by pick-

ling, where large quantities of metal are to be cleaned cheaply, but it is only in exceptional cases where this is necessary.

The question of actual horse-power required for welding both axles and tires has been carefully considered, and the following figures are based upon actual experience in various works and from very careful electrical and mechanical tests made by reliable experts:

AXLE WELDING.

	Seconds.
1-inch round axle requires 25 H.-P. for...	45
1 inch square axle requires 30 H.-P. for...	48
$1\frac{1}{2}$ -inch round axle requires 35 H.-P. for...	60
$1\frac{1}{2}$ -inch square axle requires 40 H.-P. for...	70
2-inch round axle requires 75 H.-P. for...	95
2-inch square axle requires 90 H.-P. for...	100

The slightly increased time and power required for welding the square axle is not only due to the extra metal in it, but in part to the care which it is best to use to secure a perfect alignment.

TIRE WELDING.

	Seconds.
1 x 3 16 inch tire requires 11 H.-P. for...	15
$1\frac{1}{2}$ x $\frac{3}{4}$ inch tire requires 23 H.-P. for...	25
$1\frac{1}{2}$ x $\frac{3}{4}$ inch tire requires 20 H.-P. for...	30
$1\frac{1}{2}$ x $\frac{3}{4}$ inch tire requires 23 H.-P. for...	40
2 x $1\frac{1}{4}$ inch tire requires 29 H.-P. for...	55
2 x $1\frac{1}{4}$ inch tire requires 42 H.-P. for...	62

The time above given for welding is of course that required for the actual application of the current only, and does not include that consumed by placing the axles or tires in the machine, the removal of the upset and other finishing processes. From the data thus submitted, the cost of welding can be readily figured for any locality where the price of fuel and cost of labor are known.

In almost all cases the cost of the fuel used under the boilers for producing power for electric welding is practically the same as the cost of fuel used in forges for the same amount of work, taking into consideration the difference in price of fuel used in either case. This has been repeatedly demonstrated to be true.

We have said that all joints made by the electric process are butt welded. One exception to this is in the case of tires of certain grades of steel, in which case the electric welding apparatus is simply used as a heater in place of the forge. The two ends of the tire are slightly lapped, heat is produced by the electric current, as in the case of the butt weld, and when the desired temperature is reached, the ends are welded together by means of hammers. Joints made in this way have proved very satisfactory.

It has frequently been asked why in welding tires the current does not take the course around the circumference of the tire, rather than through the divided part where it is desired to make the weld. It is because the resistance through the long length of tire opposite to the weld is much greater than through the shorter distance of the weld. Take, for instance, a tire 9 feet in circumference. The clamps for this would be, say, 4 inches wide each; the distance between them where the weld is to be made, 2 to 3 inches. This would leave a length of something over 8 feet around the whole side of the tire, which would have to be traveled by the electric current should it pass that way. Now, the resistance through this 8 feet of solid metal is very much greater at all times than through the 2 or 3 inches of metal where the weld is to be made, even with the break in the center. The result is, that as a current of electricity will always take the path of the least resistance, that it would pass in such a tire almost entirely through the point of welding. As we reduce the size of the tire, thus bringing the length opposite the weld nearer to that at the weld, we find there is a certain amount of current which will travel on the solid side. As we finally reduce the

size of the circle to that of a hub band, a certain amount of electricity will pass around the whole side, and in some cases this is sufficient to heat it, but only to a comparatively low temperature, and this is found to be advantageous, as the annealing effect upon the band takes out the stiffness and makes it easier to force the ends to be welded together when it is desired to do so.

Aside from tire and axle welding in carriage shops, many other forms of welds can be advantageously made, such as right angles, T joints, fifth wheels, step irons, &c. Carriage rails are also welded in large quantities, favorably competing with exceptionally cheap forge work, one firm alone having, during the past year, made over 700,000 welds in this specialty. When an irregular shape is to be welded, as is frequently necessary in carriage rails, &c., it has been found best to make the 1, right angle, or whatever form may be necessary, of a drop forging, which can be welded into the rail itself. In this way it is possible to get much greater strength than in either the forge or electric processes, where the right angle or "jump" weld is made direct.

Welding Plants for Jobbing Purposes.

In many localities throughout the country there are manufacturers who are desirous of having their welding done by the electric process, and yet have not sufficient work themselves to warrant the necessary outlay.

The aggregate of the work done by such manufacturers is large, and to meet this want it is proposed to start jobbing plants in different cities.

These plants will be equipped with machines of different capacities of the universal type and will be supplied with all necessary facilities for doing such work as may be desired in their vicinity.

The Illinois Mining Institute met at Streator on the 16th inst. About 50 new members were received. During the session the following papers were presented and discussed: "Blasting from the Solid," J. G. Massie, Belleville, Mine Inspector for the Fifth District; "Mine Creeps or Squeezes," James Freer, Peoria, State Mine Inspector Third District; "Handling and Cleaning Coal," Robert Lee, superintendent Coal Valley Company, Rock Island County; "Simple Causes of Failure in Mining," Richard Sneddon of Virden; "Introduction of Machines Into Southern Illinois," William Fletcher of Collinsville; "Endless Rope Haulage," J. E. Carr, superintendent Leavenworth (Kan.) Coal Company; "Faults in Peoria and Fulton Counties," Richard Newsam; "Electricity," D. J. Lloyd, superintendent Edinburg (Ill.) Coal Company.

The *Bulletin Officiel de la Marine*, issued by the French Government, gives instructions for the preservation of tubular boilers when not in use. They should be completely filled with water, the acidity of which has been neutralized by the addition of lime or soda. Externally the tubes should be painted, where accessible, with red lead or coal tar, but such parts as cannot be got at for this may be preserved by burning coal tar under them. The smoke of the tar is condensed in the cold tubes and forms there a protecting layer which prevents corrosion.

Having harnessed Niagara, it is now proposed to utilize the waste water power of the Delaware, by damming the river somewhere near Bristol, Pa. There is an available power equal to 12,000 horse power for every 10 feet of fall in the river. The fall between Easton and tide is 152 feet.

The Longitudinal Elasticity of Boiler Flues.

At the meeting of September 27 of the German Society of Mechanical Engineers, Mr. Knaut, manager of the Schulz Knauth plate mills in Essen, Westphalia, read a very interesting and valuable paper on "Tests of Longitudinal Elasticity of Boiler Flues."

The subject matter and principal deductions from the tests made are given in the following abstract, and a close perusal of the same will be a labor well paid by the new knowledge obtained. The desire to

have been produced, in all of which the main flues are the most important and sensitive parts, as they either serve as furnaces or are at least immediately adjoining the center furnace or highest temperatures, and always receive the most careful attention in the designing department as well as in the shop.

The flues are nowadays invariably of circular section; but different methods of stiffening them and of connecting the several sections with each other or with the boiler heads have produced a variety of forms now in common use. Inasmuch as these flues must not only be able to resist steam and water pressure, but must

ing the influence of unequal temperatures in the water during the period of raising steam, and supposing that when in operation they remain practically uniform, insured by proper circulation of the water, it is nevertheless undoubtedly true that different parts of the boiler are subjected to different temperatures due to differences of temperatures in the surrounding furnace gases. It is self evident that the temperature of the flues must be higher than that of the shell.

As far as the author is aware, no direct experiments have as yet been made to determine these differences, but their existence is demonstrated by experience, as in

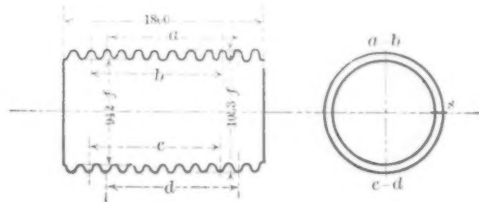


Fig. 1.—Corrugated Flue, No. IV

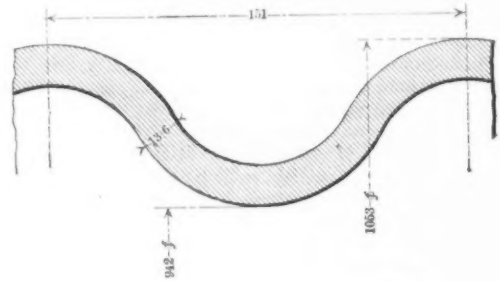


Fig. 2.—Section of Corrugation.

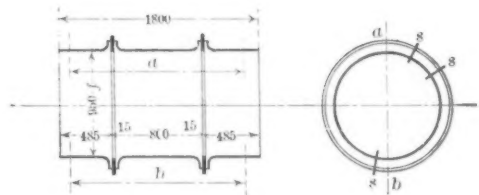


Fig. 3.—Adamson Flue, No. VI.

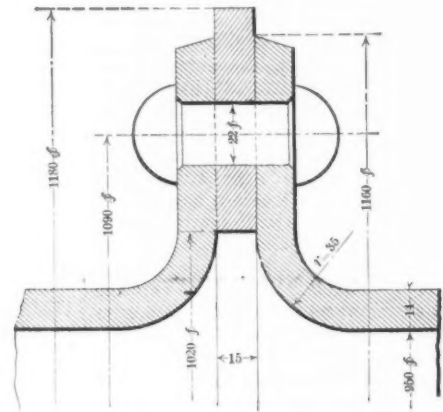


Fig. 4.—Adamson Flue.

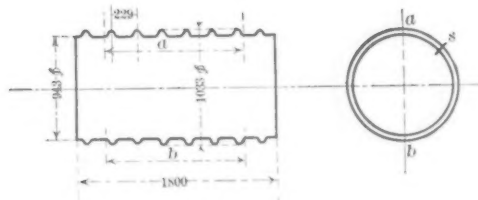


Fig. 5.—Purves Flue, No. VII.

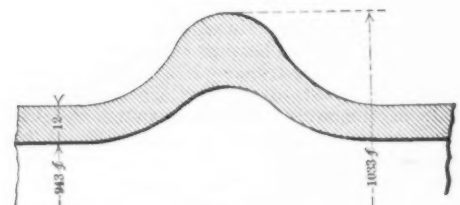


Fig. 6.—Section Purves Flue.

THE LONGITUDINAL ELASTICITY OF BOILER FLUES.

obtain dry steam of high pressures, which has been felt to be a necessity for successful operation of triple-expansion and compound engines, has constantly increased the field for internally fired flue boilers. Such boilers long ago superseded all others for marine purposes and are indispensable for portable boilers, while they have recently been introduced for locomotive engines with very satisfactory results, as in the Lenz system. Numerous vertical boilers are now built having internally fired flues or corrugated furnaces, but these latter are of particularly frequent application in stationary boilers having one or two flues. By combining the flues with an overlying return flue, or by introducing Galloway tubes or the return tubular system, innumerable different designs

also be proof against all sorts of unequal strains produced by unequal expansion and contraction, due to different and varying temperatures at different points, it seemed of great interest and value to determine the exact behavior of the different kinds of flues in the market by actual tests; these tests were to determine the resistance to temperature changes of these flues.

Taking the case of an internally fired flue boiler of about 32 feet length and 78 inches diameter, whether single or double flue construction, we will find by actual measurement a furnace temperature of about 2460° F. over the grate, while at the back end of the flues it falls to 1200° F., and the gases passing over the shell have a temperature of but 570° F. Neglect-

all boilers in which the flues are not flexible and are connected to stiff heads, it is well known to experts that leakage invariably occurs at the points of connection as soon as put in service. In fact, the amount of swelling or buckling of the heads, when free to move, near the connection with the flues, is a good measure by which to determine the differences of temperature existing between the shell and flues. On the basis of such practical observations of unbraced heads, it has been calculated that there is a difference of 105° F. between the temperatures of flues and shell in the boiler above described. Assuming this difference of temperature, we find it would produce an expansion or elongation of 0.3 inches in a flue 32 feet long when the coefficient of expansion is

0.00124. As the heads are firmly braced and rigidly connected to the shell as well as to the flues, this difference in expansion must produce abnormal strains in one or many places or parts, which can only be taken care of by distortion of the boiler. A very small part of the strains is transmitted to the shell, which is elongated slightly under their influence. The greater part, however, produces elongation of the boiler heads and stays or braces or excessive compression of the flues, which may produce bulging or buckling. In all boilers having flues which are practically incompressible, or, at least, offer considerable resistance, proper provision must be made in the bracing to permit distortion of the heads.

We have, however, at the present time hardly the crudest empirical formulæ by

be braced so thoroughly that leakage is entirely avoided, and be strong enough to resist all strains due to elongation of flues without distortion.

When the shell receives no part of the heat, as is the case in locomotive boilers, then it becomes plain that the relative expansion becomes very much greater, as the difference in temperatures rises to 1200—375 = 825° F., instead of 105°, as above. In the case of marine boilers, it is exceedingly difficult to determine to what extent the flues may act as braces or stays, on account of the complexity of construction and the great variations of temperature in adjoining parts. There are considerable variations in the temperatures of the furnace flue. The smoke box has still a different temperature, and the back head, or diaphragm, is subjected to great variations between

and the results plotted in curves for purposes of comparison. The method adopted was to compress the flues to be tested in a hydraulic plunger press of 64 inches diameter, by placing them between the fixed end and the plunger after having turned off their ends truly parallel and at right angles to their axes, the stress being applied parallel to the axis. In this press a pressure of one atmosphere would produce a load of 47,500 pounds when the stuffing box friction is neglected.

Seven flues were thus tested; five of which were corrugated, of different thickness of metal; one was a cylindrical flue with Adamson flanges, which were 13½ inches apart, and finally a ribbed Purves flue. The six former were made at the works of the Schulz Knaut Company, while the latter was brought from

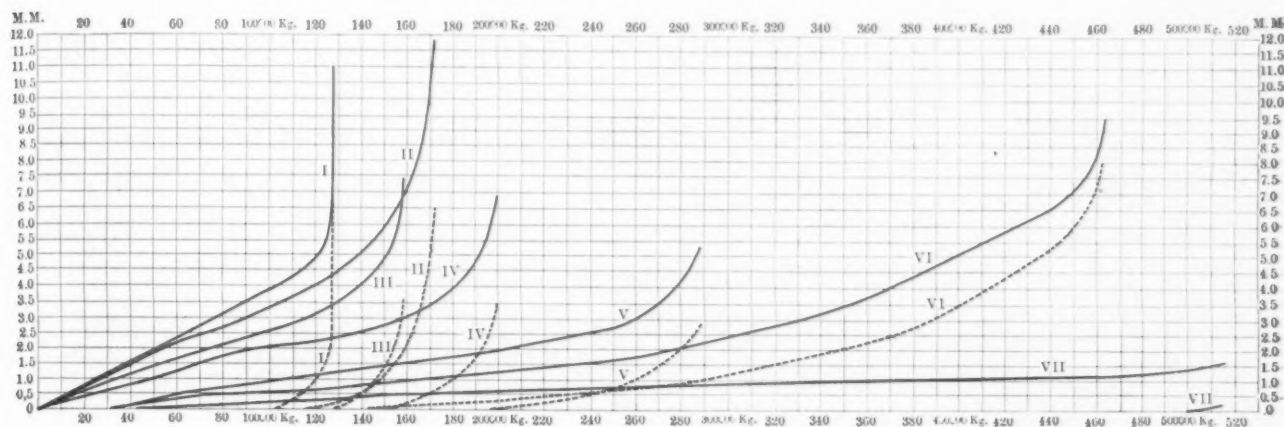


Fig. 7.—Plotted Tests of Longitudinal Elasticity of Boiler Flues.—Nos. I, II, III, IV, V, Corrugated Flues—No. VI, Adamson Flue.—No. VII.—Purves Flue.

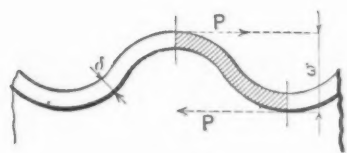


Fig. 8.

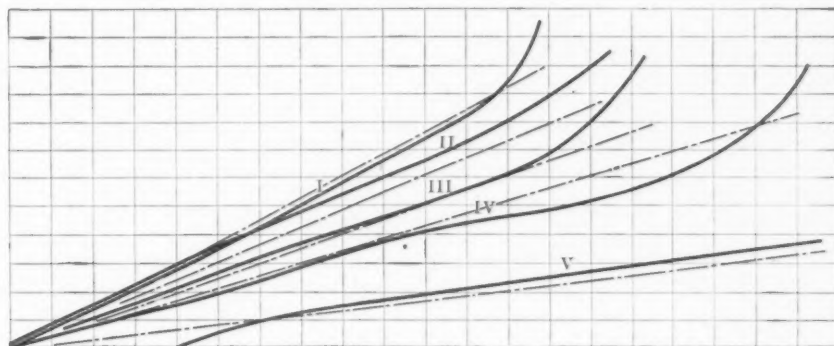


Fig. 9.

THE LONGITUDINAL ELASTICITY OF BOILER FLUES.

which the elastic resistances of flat surfaces can be determined, and they are not reliable, especially for high steam pressures. That this fact has become generally accepted is demonstrated by the action of a number of large manufacturers, who have found the means sufficient to make exhaustive experimental investigations of the subject, which have been assigned to Professor Bach of Stuttgart. It remains to be seen whether these investigations will supply the desired knowledge, but it must in any case be desirable to boiler makers to avoid this difficult construction by substituting flexible flues and thereby avoiding all trouble.

Proper bracing of boiler heads to not only resist the steam pressures but at the same time to provide for the changes of the flues is indeed a very difficult problem, as very slight deficiency or excess may produce the most deplorable results. When, however, the flues have longitudinal flexibility the boiler heads may easily

the highest and mean flue temperatures. All of these parts are constantly working, and here faulty construction will immediately produce leakage at the return flue joints upon raising steam. To avoid this, the heads and crown sheet are sufficiently well braced to resist all strains, neglecting the bracing effect of the furnace flues entirely and giving the latter ample longitudinal flexibility to allow for any possible elongation or strains, thus avoiding leaky joints altogether.

Although the above discussion demonstrated the demands made upon the longitudinal flexibility of flues, no facts or results of tests have heretofore existed which could serve the practical boiler maker as a guide. Therefore a series of full-size tests of boiler flues were made at the Essen works during last spring in the presence of a number of State officials and engineers, to determine the longitudinal elasticity and flexibility of different forms of flues. The tests were all made in precisely the same manner,

John Brown & Co., Limited, of Sheffield. The flues were all about 71 inches long. From two to four places were selected on the different flues for purposes of measurement, on which center-punch marks were made about 48 inches apart; steel bar compasses were used for taking measurements, provided with wooden handles to avoid error due to expansion produced by the warmth of the hands.

In the case of the corrugated flues the four measuring places were selected on alternate corrugations, as indicated in the figures by letters *a b c d*, while the location of the welds is indicated by the letter *s*. The pressure exerted by the press was measured by two gauges, one of which was a carefully calibrated standard gauge. After placing the flues in position in the press, the distance between center-punch marks was again verified by the beam compasses and before any pressure had been applied; thereupon a pressure of one atmosphere per square inch (14.7 pounds.

was applied, and the contraction indicated by holding one point of the compasses in the punch mark while a scribe mark was made on the flue with the other, on a surface which had been previously prepared for the purpose. The distance between the scribed line and the punch mark was the amount of compression, as the pressure was maintained at a constant point by opening the admission valve enough to make up for the leakage. After thus measuring the contraction at all points previously prepared, the pressure was entirely released and the flues were then examined to determine whether any permanent set had been produced. Having completed these measurements, the pressure was again applied but raised one atmosphere, and this was continued until the flues would no longer carry the pressure applied or until the capacity of the press was reached, at 25 atmospheres. In many cases the same loads were repeated several times, or carried for a longer period, and it was found that elastic resistances were uniform or constant, and such repeated tests did not produce permanent set when none had been produced by the first application of the load.

The mean of each of these sets of measurements was then reduced to a standard basis of measurements of 39½ inches (1000 mm.) and plotted on the diagram, as shown in Fig. 7, and marked I to VII, and in which the full lines give curves of measurements of compression under loads, while the dotted lines show curves of permanent set. These curves are obtained by plotting the percentage of longitudinal compressions as ordinates, and the actual loads applied by the press as abscissas.

The great difference in these curves is most striking and shows the relative longitudinal flexibility and rigidity in a most remarkable degree. As was to be expected, the corrugated flues I to IV are the most flexible, and in proportion to thickness of metal, while flue No. V, which has more shallow corrugations, although made of much thinner metal (0.4 inch) is nevertheless, considerably stiffer. Following this one in stiffness is the Adamson flue, No. VI, and the least flexibility is shown by the Purves flue, No. VII, which could not be crushed, as the hydraulic press lacked sufficient power.

In the table below we give all the necessary information about the different flues,

compressibility of the different flues under a load of 220,480 pounds (100,000 kg.), reduced to a standard length of about 39½ inches (1 m.).

Column 9 shows that the relative shortening reduced to 1 m. of length was as 375 : 330 : 260 : 210 : 95 : 60 : 20, while in order to produce a compression of 1000 part of the length required loads, as given in column 10 of the table, of 59, 63, 79, 108, 238, 374 and 771 times 1000 pounds about. In order to determine the elastic compressibility of these flues, the shortening under which permanent set was first observed was noted, as in column 11, and was in the proportion of 390 : 419 : 336 : 320 : 190 : 84 : 158. These numbers are in a regular series, except 419 and 158, corresponding to flues Nos. II and VII, and is accounted for by the fact that they were made of harder material, as is shown by columns V and VI in the table.

For stationary boiler flues in Germany, Nos. I and VI would undoubtedly be in frequent competition, as they are both designed for similar working pressures; but columns 9 and 10 show that the corrugated flue No. I is about six times as flexible as No. VI, the Adamson flue, while the latter weighs 54 per cent. more than the former. (See column 4.)

In marine engineering those flues which are designed for pressures of about 160 pounds are applicable, and hence flues Nos. II, IV, VI and VII would be selected according to the British standards, which make a difference between softer and harder material, or such as have a tenacity less or greater than 58,300 pounds per square inch, while all other rules are established for the use of softer materials alone. Harder material was used in making flue No. II solely as a matter of interest to the Schulz & Knaudt Company. The rules of the British Lloyds show but one formula for the Purves flue, for a material having a minimum tenacity of 58,300 pounds. Probably softer material was not considered applicable for Purves flues, because this would increase the thickness of the metal considerably and hence make the weight excessive; while flue No. VII shows that it has but one-seventh the longitudinal flexibility of No. IV, which is 13 per cent. thicker and 22 pounds heavier.

In comparing results it became desirable to know whether the relative flexibility of

to the elastic theory. the compression, z , of the strip in the direction of the force p will be equal to $Z = \frac{pw^3}{aEI}$, in which E is the coefficient of elasticity and I = the moment of inertia of the cross section of the strip and a is a constant, depending upon how the ends of the strip are held. In this formula the material is considered incompressible. Let P represent the total end pressure applied, D the diameter of flue; then we will have, as there are nD unit strips in a complete flue, $pnD = P$, or $p = \frac{P}{Dn}$. Substituting this value

in the above formula, we have the compression of the whole flue, as referred to one-half corrugation: $Z_1 = \frac{Pw^3}{aEIDn}$, in which

substitute the moment of inertia of a rectangular section of S in height by its value $I = \frac{S^3}{12}$, we have $Z_1 = \frac{Pw^3 12}{aES^3 Dn}$. As

the ends of these strips are all held in the same manner, a is a certain constant, as well as E for low steels. As the corrugations in five flues were identical, m becomes constant, and $\frac{12m}{aEn}$ is therefore con-

stant, and can be represented by the value C , hence the compression of the entire flue under a load P becomes $Z = \frac{Pw^3}{S^3 D} C$ when

thickness is S , depth of corrugations is w and diameter D .

Thus calculating the compression of the different flues by substitution in this formula, and plotting the results obtained, we obtain the dotted lines shown in Fig. 9. The value of constant C has, of course, been chosen with relation to the size of the diagram.

From this we observe that the curves obtained by calculation are very similar to those obtained by observation of tests; considering that the thickness of plates such as are used for flues often varies by more than 10 per cent. and that this dimension is used in the above formula in the third power, it becomes apparent that the slight differences between observed and calculated curves can be readily accounted for. Hence the legitimate conclusion to be drawn from our experiments is that the flues behaved under test in accordance with fixed laws; that, barring slight errors due to the smaller loads applied, the results observed agree very closely with calculations. Even flue No. II, showing a tenacity of 66,000 pounds, gave equally close results, when comparing compression observed with that obtained from calculation by the above formula. It is evident that this should be so, as the tenacity does not enter into the formula, and hence cannot affect the longitudinal flexibility of the flue, but merely the ultimate resistance or permanent set.

It remains to be shown whether the conditions existing during the tests correspond with those obtaining in boiler practice. The temperature of the flues on the day of the test was 59° F., while that of a flue in a steaming boiler would be many hundred degrees, varying, of course, with the steam pressures and the condition of the fire and gases. According to investigations by Prof. A. Martens (in *Zeitsch. Ver. deutsch. Ingenieure*, 1883, page 126, and *Stahl und Eisen*, 1888, page 76), there is no difference in the properties of low steels up to a temperature of 572° F., after reaching which the material begins to grow weaker. Since we know that the temperature of boiler flues does not reach 572° F., we are quite certain that the results obtained in the hydraulic press represent those existing in boilers in service, and as we have seen that the ultimate resistance of the material does not affect results, we are warranted in the above assumption.

No. of flue.	Style.	Plate, thickness in inches.	Weight, in lbs.	Tenacity, in lbs. per sq. inch.	Elongation, % in 8 inches.	Maximum working pressures.		Depth of corrugations, in inches.	Compression of flue in % under 220,480 lbs. load.	Load required to produce compression of 1000 of length in lbs.	Elastic limit passed at compression of % of length.
						Hamburg standard.	British Lloyds.				
I....	Corrugated...	0.399	1140	52,900	25.0	135	105	1.93	6.375	59,520	0.39
II....	Corrugated...	0.462	1257	66,000	28.5	159	160	2.00	0.33	63,920	0.419
III....	Corrugated...	0.474	1330	47,360	30.0	166	135	2.02	0.26	79,380	0.336
IV....	Corrugated...	0.537	1598	49,490	29.5	190	159	2.19	0.21	108,040	0.32
V....	Corrugated...	0.399	1085	54,730	26.0	129	.....	1.18	0.095	238,130	0.19
VI....	Adamson....	0.533	1764	51,320	29.5	129	163	.....	0.06	374,820	0.084
VII....	Purves....	0.474	1576	60,830	26.0	165	150	.....	0.02	771,730	0.158

showing their differences in every particular, the weights, working pressures as deduced from the British Lloyds as well as from the Hamburg standards. The tensile strength of the material used was obtained from strips cut off the plates before bending and observations made on the 8-inch (200 mm.) standard length. In the case of the Purves flue, No. VII, ordered for the purpose, a strip was cut from the end, straightened and then tested in the same manner and machine as the others. The flues had practically the same diameter of about 37 inches in each case, and therefore serve admirably for making comparisons, when taking into account their allowable working pressures. In the following table will be found the measured

the flues was in accordance with a fixed law, and whether it could be explained by the well-known theory of elasticity. Should the observed results agree with these laws, it would on the one hand be good evidence that the tests had been made correctly, while on the other it would prove the possibility of calculating the behavior of any given design of flues. For this purpose we shall consider corrugated flues alone, and assume a strip to be cut from one of a length of one-half of one corrugation, as in hatched portion of Fig. 8, in which S is the thickness of metal, one unit wide

The pressure on the ends of this strip is p , with a lever arm, w (depth of corrugations), of the couple of forces. According

The circumstance of unequal expansion due to difference in temperatures on opposite side of flues causing distortion, is a different question, and is the cause of eccentric and unequal pressures on the ends of the flues.

The Bouton-Horton Car-Wheel Chuck.

The E. Horton & Son Company of Windsor Locks, Conn., have recently put on the market a new chuck for holding car wheels. It is constructed with an opening in the center large enough for the hub and back of the wheel to enter sufficiently for the back of the flange to rest against the body of the jaw, while the

Isella in Italy, and its total length will be 12.4 miles. It is expected that from eight to nine years will be required for its construction.

The Trunk Line Pool.

The preliminaries for the restoration of the Trunk Line pool have been arranged at a meeting of all the railroad presidents held in this city last week, and it seems probable that the scheme will be perfected. The demoralization of rates is so general that action of some sort was deemed indispensable. Although the proceedings of the meeting were supposed to be private, enough has leaked out to show that there was a gen-

turned from an inspection of the lines in Great Britain, is quoted as saying that if the most prosperous English roads were to do business at the same rate as the American they would not pay operating expenses. The proposition is to restore both east and west bound freight rates between New York and Chicago to the basis of 75 cents per 100 pounds for first class on December 1.

Three members of the Carpenter Steel Company of Reading, Pa., who are manufacturing projectiles for the navy, called on Secretary Tracy at the Navy Department at his invitation, and had a long conference with him in reference to the company's contract. Secretary Tracy was

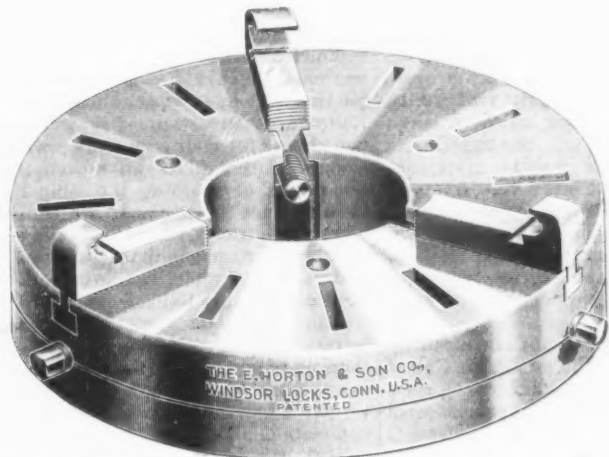


Fig. 1—Face View.

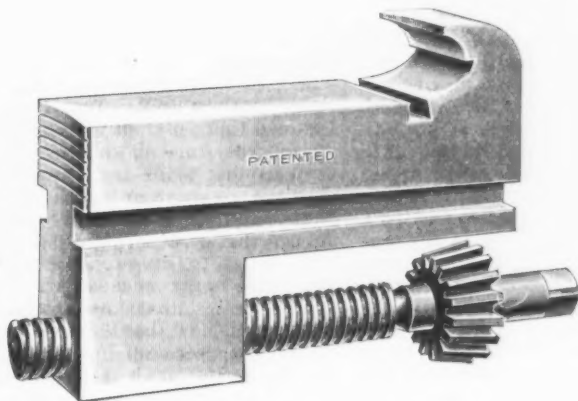


Fig. 2—Jaw and Driving Screw.

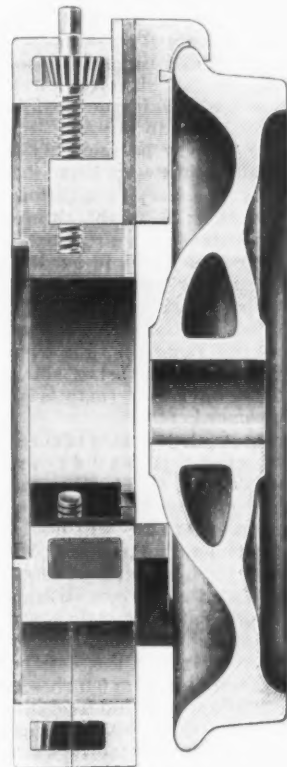


Fig. 3.—Section Showing Wheel Held in Chuck.

THE BOUTON-HORTON CAR-WHEEL CHUCK.

bite of the jaw when thrown into work bears upon the chilled face of the wheel flange. The wheel is thus automatically centered for grinding its periphery. This chuck can be used on a Bouton car-wheel grinder or any rotating head that will receive it. Of the accompanying drawings Fig. 1 is a perspective view of the chuck, and Fig. 3 a sectional view showing the car wheel in position in the chuck, and Fig. 2 is a view of the jaw and driving screw, showing the bite shaped to fit the flange of the wheel. The latter view also shows the driving screw and pinion gear by means of which the chuck is operated and the slot running the whole length of the jaw by means of which the jaws are interlocked with the body or shell.

Work on the new Simplon tunnel has actually commenced. When completed it will be the longest tunnel in the world. It will extend from Brieg, in Switzerland, to

eral agreement, in view of the fact that the 70-cent basis rate has dropped to a 40-cent rate on the leading lines. In making new arrangements a beginning will be made with coast-bound freight, and Commissioner Goddard will confer with representatives of the several roads before the percentages are fixed, in order to secure an equitable adjustment, with due regard to the weaker roads. It is said that he will take the business of the last three years as a basis to be submitted for ratification. This, it is understood, will show about 30 per cent. of the business for the Vanderbilt lines, 25 per cent. for the Pennsylvania, 18 to 20 per cent. for the Erie, and the remainder to be divided among the weaker routes. If a final agreement is not otherwise attainable the matter will be left with Allen F. Walker of the late Western Traffic Association for a decision. President Roberts of the Pennsylvania Railroad, who recently re-

convinced, he said, that the Carpenter projectiles were as good as those made by Holtzer in Europe, heretofore considered the finest in the world, and this view is also entertained by Commodore Folger, Chief of the Bureau of Ordnance. The Carpenter Company contemplate improving their projectiles by Harveyizing the steel points, thus obtaining greater penetration in the new nickel-steel armor plates.

The Civil Service Commission will hold examinations on November 29 to fill two vacancies in the Quartermaster General's Office, one in the position of assistant civil engineer at a salary of \$1200, the other in the position of architectural draftsman at a salary of \$1400. An application blank and information as to the subjects of the examination may be obtained of the U. S. Civil Service Commission, Washington, D. C.

Discrepancy in Chemical Work.*

BY C. B. DUDLEY, ALTOONA, PA.

I have recently seen a series of, I think, 16 determinations of sulphur in a piece of pig iron, supposed to be the same iron, that differed from each other from 0.005 up to 0.02 per cent., or the extreme results (I am giving these figures from memory) were about as 1 to 4. Now, obviously, while the amount of sulphur is excessively small in this case, not being a matter of very great importance, yet as bearing on the accuracy of chemical work, the result is something appalling. I have seen a series of phosphorus determinations recently, made by six or seven chemists, where the extreme results differed 0.03 to 0.04 per cent. in a total of about 0.10 per cent. I have a friend, who, for a number of years, was manager of a large furnace, who some four or five years ago sent out borings from some pig iron to eight or nine different chemists for phosphorus determination, and when he got the results back, no one of the chemists knowing that any other was working on them, they differed almost as 1 to 2; and, in his nervous, energetic way he said: "I said, in my wrath, all chemists are liars!" Perhaps it is not necessary to mention any more discrepancies; I might, however, give one more instance. In a recent analysis of bronze we obtained in our laboratory a trifle over 9 per cent. of tin; another chemist, working on what was supposed to be exactly the same metal, being half of the same pig, got over 10 per cent., the discrepancy being about 1½ per cent. Now, obviously, there is something wrong somewhere.

The first cause of discrepancy in chemical work is that the two chemists did not work on the same sample; or, in other words, non-uniformity of samples. Upon this point, your own experience will doubtless give each of you an illustration. At one time we were buying spiral springs on specifications that the carbon should not be below 0.90 per cent. The springs we examined were made out of a steel wire about ¼ inch in diameter, the coil being about 1½ inches across and 5 or 6 inches long, what we call "A" springs, and used to hold the box lids tight to the oil boxes under the cars. We found in those springs so low carbon, in a number of cases, that we rejected them. The manufacturer got some one else to determine the carbon in the steel, and found the requisite amount; and so, of course, the question came up for an explanation as to the discrepancy. The discrepancy was very easily explained, and we ourselves in our later work found the same peculiarity in other steels; the borings required for analysis of these springs were simply what we could get handily, mostly from the outside of the wire. The manufacturer took the same springs, had the outside turned off, and then took his sample from the center of the wire. This was the cause of the discrepancy, as we have proved by a number of test analyses. Apparently the outer layer of a steel rod that has been heated, as is commonly done with spiral springs, very frequently loses 0.10 per cent. of carbon in the fire. Or, it may be segregation during cooling explains the difficulty. Of course, it is perfectly obvious that if the samples differ there is a legitimate and good reason why the analyses should differ. This is especially true of shipments that are made up of large quantities, and are sampled by the single sample. In all our work, when we come to a serious difference between ourselves and

any one else, we exchange samples. The second cause for discrepancy in chemical analysis is impurity in the chemicals.

A third cause of discrepancy in chemical analyses is what may generally be called "poor manipulation." I know of chemists who think this is the principal cause. The main cause of discrepancy in chemical analyses, some say, is poor manipulation, or lack of skill. My old teacher in chemistry was characterized by this one very remarkable peculiarity, namely, he never believed anything as long as there was a shadow of doubt, and after all known uncertainty had been removed he was not quite sure; in other words, he was a man who was really a struggler for accuracy. He used to say to me in his very dry way, "No chemist can make an accurate analysis. There are chemists who can work near enough to accuracy so that their work is valuable. There are chemists who cannot. And that is the difference between chemists." Of course, what I mean by an accurate analysis is a question of limits. The point I want to make, however, is not a dissertation on accuracy, but the difference between chemists due to manipulation. Undoubtedly, this is a very frequent source of error. Now there is a fourth cause for discrepancy in analyses, if I understand it rightly, and that is the method. I think you will all agree that two methods may not give exactly the same results.

Now we come to perhaps the most important point in our whole talk, viz., How shall two chemists who differ check each other up? Or, come to an agreement with each other? I answer, where two chemists differ, and the difference is due to working on non-uniform samples, or on not exactly the same sample, the matter is easily checked up by changing samples. Also, differences due to impurity of the chemicals are not very difficult to check up, either by checking up your chemicals, or by the dummy. Sometimes it is true, the differences due to impurities may be very abstruse and hidden, and difficult to find; but, by changing chemicals, as we have done a number of times, you can frequently locate the difficulty. Also, still further, where manipulation is at fault, it is not a very difficult thing for the two manipulators to get together and work in the presence of each other, as is frequently done, I understand, in Colorado in assaying. These three difficulties—or, rather, discrepancies due to these three causes—are not very hard to overcome; but here comes the poser. Suppose that the difference is due to method, and suppose that I say I have used a good method, an approved method, a published method that is recommended, and you say the same in regard to your method—who is going to decide between us? Both of us are, perhaps, a little obstinate, and both of us perfectly right in the position we have taken. If both of us have used regular, well recommended methods, who is going to decide between us?

Before answering, let us see what is the necessity for a decision. Oftentimes a good many thousand dollars depend on our work. If we make a mistake by using a bad method, or a wrong method, it may mean a good many thousand dollars to somebody whose product we have rejected. He may have to pay the return freight and have the product sent back on his hands; and, as it doesn't pass specifications, he may not be able, without serious loss, to sell it. On the other hand, if the chemist on the other side has used a bad method, we may have to accept inferior material. As you know, more and more every day, large commercial transactions are based on chemical analyses, and differences between chemists may mean thousands of dollars.

We have proposed the following method for overcoming this difficulty. I do not

know that it will be approved by the profession, but we do not see any other way out of it, and many chemists and managing men of the different mills whom we have consulted on the matter have approved the suggestions we have made. The method is simply this: Publish the method we use and make it a part of the specifications. For example, suppose we are buying spring steel on specifications that it shall not contain over 0.05 per cent. phosphorus. We simply say this to the manufacturer: "We want steel for springs that shall not contain over 0.05 per cent. of phosphorus, and the phosphorus shall be determined in a given way. Whatever you find by this method, that is the amount of phosphorus so far as our transaction goes." We see no other way out of this difficulty. Now, let us see—this is a pretty bold assumption; the chemist of the Pennsylvania Railroad Company assumes to dictate to the profession what methods they shall use. Yes; but only for transactions in which the Pennsylvania Railroad is involved. Use any method you choose for your own work; we do not assume to dictate to you a particle; but, as a means of avoiding the difficulty due to difference of method, we simply say to you, arbitrarily, that this is the method that must be used to determine the phosphorus, for example, in transactions where the Pennsylvania Railroad is involved. If we had a standard method, or if any learned society will give a method which shall be regarded and accepted by chemists as final, we will bow to it instantly; we will adopt anybody's method, if it is applicable. We claim no especial originality; we simply give you the method which we use.

Now, let us see what is going to come of this. We prescribe a method which shall be used for determining phosphorus, carbon, silicon, sulphur, or whatever it may be. The method as we use it will give certain results; the other chemist will get the same results—at least we assume that he will. The Pennsylvania Railroad Company put an upper limit on phosphorus, since phosphorus is injurious to steel—that is to say, the phosphorus must not go above so much; the interest of the railroad company is to have a method that gives as high results as possible, so as to keep phosphorus down. The steel works chemist, on the other hand, desires that the method in his hands shall show that the steel is low in phosphorus, because if it gets above a certain amount it is rejected—in other words, the two parties are on opposite sides of the method. It is one's interest to have a method that will cause the rejection of the steel if it is high in phosphorus, and the other wants a method that will make the steel pass. Now, my experience is, that in anything where men's pockets are involved on opposite sides of a question, you are pretty apt to get at the truth sooner or later. This is going to bring a criticism of the method of determining phosphorus by the parties in antagonistic interest. Our thought is this: The method we sent out to-day is entirely subject to revision; if any one of you finds a hole in it, say so, and the change will be made just as soon as we can make it, providing your work is confirmed. It is not our method; it is a method to be used to decide certain chemical questions. Our hope is that there will be enough criticism by these parties in antagonistic interest on the various methods put forth, so that sooner or later there will result a method which we will all be willing to accept as standard. It may be that the work of fifty chemists will be required before we get such a method. There is no assumption on our part of superior knowledge, no desire to dictate in any shape or form to the profession; but we have a difficulty to

* Extracts from an address to the members of the Chemical Section of the Engineers' Society of Western Pennsylvania at Pittsburgh, September 27, 1892.

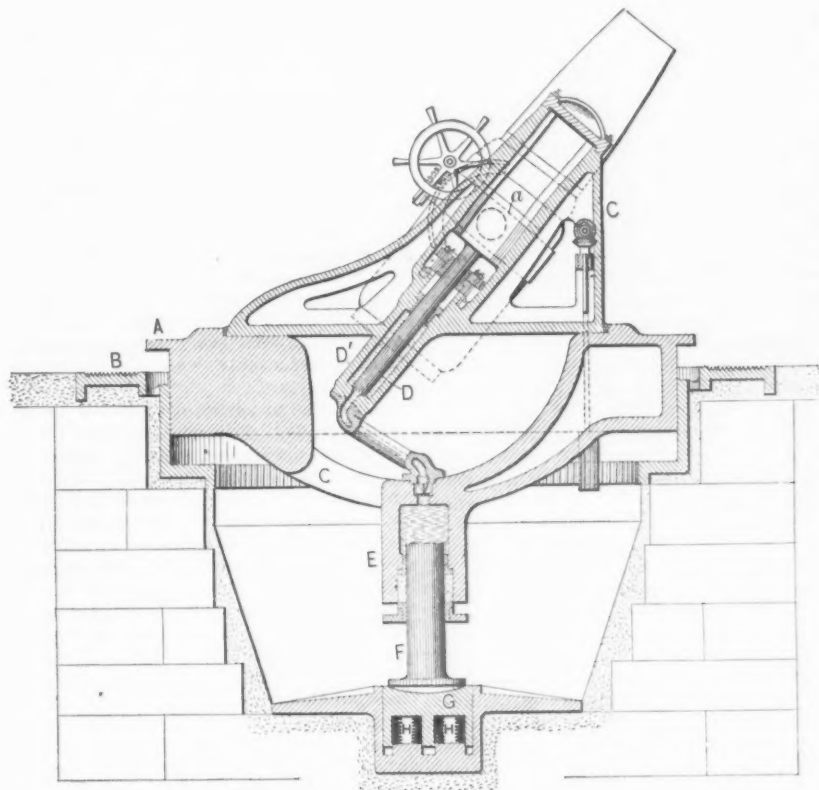
meet and we cannot see how to get out of it in any other way.

I asked Professor Langley what he thought of it. He said he thought that some learned society should approve the method. *Per contra*, a member of the American Chemical Society is reported to have said that he would bitterly oppose any attempt on the part of that society to sanction any method. He did not think any learned body should sanction a method. On the other hand, the agricultural chemists of this country, as I understand it, have done this very thing, namely, they have agreed that in the analysis of fertilizers whatever phosphoric acid is shown by a certain method, which they defined in convention, shall be called "soluble" phosphoric acid, and the amount of phosphoric acid that is shown by another method or modification shall be called the "reverted" phosphoric acid, while the amount of phosphoric acid shown by still

with any method, and get a discrepancy in duplex or triplex, there must be something wrong with me or with the method. Now we are trying to do enough work on each method before we send it out, so that if the directions are fairly well followed uniform results will be obtained by the method. If there is an element of uncertainty in the method that cannot be covered by explicit directions, then, of course, that will be a bad method to send out. After we have decided on a method we put it into print, then we turn it over to the boys in the laboratory, with no other directions than the printing and see what they can get out of it.

The Morgan Mortar Mounting.

William H. Morgan of the Morgan Engineering Works of Alliance, Ohio, is the designer of this mortar mounting. This de-



THE MORGAN MORTAR MOUNTING.

another method or modification shall be called "insoluble" phosphoric acid. The method was first proposed five or six years ago, has been modified three or four times, and now nearly all the agricultural chemists in the United States, if I am right, are determining the phosphoric acid in fertilizers by the method adopted by the agricultural chemists in convention. If some convention would take this work off our shoulders we would be delighted. We assume it only because we do not know how to get along and meet our difficulties in any other way.

We purpose, as I have said, to send out a printed proof of this method for determining phosphorus, and the purchasing agent will send it to all parties from whom we buy steel, so that every chemist who will have to use the method will have a chance at it before it is finally issued. The phosphorus method will come out probably in the next two or three weeks, and we hope to follow it soon with the others. I would say for your information that in doing this it is, of course, incumbent upon us not to send out a method that will not give uniform results, by which I mean that if I make an analysis

sign is intended particularly as an improvement on those mountings having hydraulic cylinders so arranged that the recoil of the gun forces fluid contained in the cylinders carried by the carriage down into a cylinder below the carriage, whereby the carriage is elevated and the energy of the recoil stored for elevating the gun. As water is practically incompressible, it will not yield to pressure when properly housed, and hence may prove too rigid and unyielding under the first shock of the recoil. The object of the new design is to provide means adapted to yield under the first shock of the recoil and before the weights begin to move.

The carriage A normally rests on a flange of the ring B and is provided with castings, C, having inclined slideways in which the boxes a carrying the trunnions of the gun, move. The boxes are connected to the upper ends of plungers, D, which move in hydraulic cylinders, D', carried by the carriage. These cylinders are connected by pipes with a cylinder, E, located below the carriage, and the water or other fluid as it is acted upon by the movement of the plungers caused by the recoil of the gun is forced from the cyl-

inders on the carriage into the cylinder under the carriage, and there acting on a plunger, F, operates to elevate the carriage. Now, by opening communication between the lower cylinder and the upper cylinders the weight of the carriage will expel the liquid from the lower cylinder and force it into the upper cylinders, thereby permitting the carriage to descend to its normal position and elevating the gun to its firing position. In the drawing the plunger F is shown mounted on a block, G, seated in the base plate and supported on a series of springs, H. The upper end of the plunger rests in the cylinder E, and hence it follows that the fluid as it first enters the cylinder E will act on the springs and compress them, thus allowing time for the weight (carriage and gun) to begin to move. The plunger is in effect a spring plunger, one end being yieldingly supported and the other end adapted to receive the impact of the fluid forced into the lower cylinder from the upper cylinder. This fluid is under powerful pressure and as soon as the upper plungers carrying the gun begin to move under the recoil the water in the upper cylinders and in the pipes between the upper and lower cylinders is put in motion, and as the fluid in the lower cylinder is under the same pressure as the fluid in the upper cylinders it follows that the instant fluid is displaced in the upper cylinders an increased space in the lower cylinder must be provided for such displaced fluid. By means of springs yieldingly supporting the plunger the latter is permitted to descend and thus provide space for the fluid forced into the cylinder. This takes the shock off the carriage, and the latter is thus given time to recover and begin to ascend gradually in comparison to what its movements would be were the plunger rigid.

Expanded Metal.

A little over two years ago *The Iron Age* presented an account of expanded metal and its uses, together with illustrations of the special machines used, and by which a solid plate of steel was converted into an open, netting like fabric. This unique product was then comparatively unknown, but as indicative of how rapidly anything meritorious finds place in our country, a few notes on the extensive use made in various constructive schemes at the Columbian Exposition alone may not only be suggestive, but possibly interesting from the applications made.

The great buildings have galleries extending about their interiors, furnishing not only elegant promenades, but restful and convenient points of observation. The sundry miles of protective railings on these are made from that form of expanded metal used for fencing. This, though amply strong, does not obtrude itself architecturally, and is practically no obstruction to the view either way. The effect as noticed on the late dedicatory occasion was dainty and pleasing.

The economy of guarding these great stretches by simply stapling the neatly painted sheets or panels into light wood posts and railings is manifest. Its adaptability is further indicated from the fact that 12,000 linear feet used for temporarily dividing up spaces at the dedication, now being placed elsewhere in the buildings, can eventually be sold for almost undiminished value at the close of the exposition for general fencing purposes. The great amphitheater building will require a further stretch of 16,000 linear feet of guards, railings, &c. These figures seem large, but will not be surprising to those who have personally surveyed the vast spaces treated.

By long odds the most original construction, and the one that will command most patriotic attention is an embodiment

of the form if not substance of a member of our new navy lying in the lake just off the grounds. This trim and formidable looking craft has its simulation of armor and plating executed in Portland cement applied to some 5000 yards of expanded metal lathing as a binding and support. The lathing was first stapled or wired to the framing, and the armor simply troweled on in a plastic state, a somewhat easier operation than would be the forming and attachment of the real thing from Homestead or Bethlehem.

Electricity is to fill a large place in actual work throughout the exposition. To provide for its distribution miles of underground conduit are being laid. To have it dry, secure and safe the bottom of this is of concrete, while its wooden walls, first sheathed with water-proof paper, are afterward plastered in cement applied to same lathing as in the other case of the ship. Some 20,000 square yards will go into this construction. Large use of a usual nature was made of it elsewhere as in the office building (exterior) electric office, general stables, dairy barns, and it is arranged for many other buildings.

A singular and new application was found for it in supplementing the framings as skeletons of allegorical figures and other statuary, as a strong foundation and binding for the rather fragile material composing them. Moreover, as a sheet of expanded metal may be molded like so much thin lead, while retaining its peculiar character of tight netting, it permitted a rough modeling into a sort of tissue and this formed and laid close to the sculptor's final surface of figure or drapery, greatly economized labor and material. From its function and location the largest share of this new steel fabric will be out of sight of the visitor next year, but as he roams over the great show such visible miles will be met with as to sustain our remark that quick appreciation is a leading characteristic of the American.

The Southern Steel Question.

A. M. Shook, president of the Southern Iron Company of Nashville, and one of the most prominent men engaged in the Southern iron trade, referred to the condition of the iron industry in Tennessee and the South and the prospects in the following terms:

We have at all times been forced to market 90 per cent. of our product north of the Ohio River. If our ores were sufficiently low in phosphorus to enable us to make a Bessemer iron, we would be at no disadvantage as compared with the other sections of this country, but it is now a known and admitted fact that with one or two isolated exceptions we cannot make Bessemer iron in the South.

While this is true, the revolution from iron to steel has been and is going on at an accelerated ratio, and the consumers all over this and all other countries are demanding of manufacturers steel where they formerly used iron.

No railroad company to-day will think of laying an iron rail; no boiler maker will think of making an iron boiler; no bridge builder will think of using iron in his work, and no carpenter will drive an iron nail. In fact, wrought iron is almost driven out of the market. Confronted with these conditions, is it not infinitely more important that this section should turn its attention to the manufacture of steel?

If it were not feasible to make steel in the South, I would hesitate to draw this picture of the industry as I see it to-day. No man living in Tennessee can say that he has no interest in this question. It is paramount to all others, viewed from a business standpoint. The people most largely interested are the railroad systems

whose lines traverse this section; but the necessity applies with almost the same force to the land owner, the tenant, the mechanic, the common laborer and to all the professions and trades. If we are forced to stop the development of our yet practically untouched mineral fields for want of a market, then the growth of our iron industry must stop. This necessarily carries with it a cessation of the growth of all other industries.

The establishment of one large steel plant in this section would at once provide a consumer for 25 per cent. of the output of all the furnaces in any given district. This would not only stimulate the erection of other furnaces and the opening of other coal and ore mines, but it would also give a stimulus to the now waiting and tired producers that nothing else can or will do. It would also give the small manufacturer the materials that would enable him to come South and locate where he could get all the material necessary for the manufacture of almost any given article, within such close proximity as to not only defy competition from points outside this section, but enable him to ship his products to outside markets. The transportation charges alone on the heavier articles would yield a good profit upon the investment. The lighter products, which always give employment to the greatest amount of skilled labor, could be shipped to more distant markets, although taxed with the additional transportation charges, and the producer compete successfully, not only in all the markets of our own country, but in the near future do a large export business through our Southern ports.

Steel has been manufactured at Chattanooga on a scale sufficiently large to demonstrate the fact that with an investment large enough to produce from 300 to 500 tons per day large returns are assured. The difference between the cost of producing a ton of pig iron in Birmingham and Pittsburgh is about \$4 a ton. If steel is manufactured by either the acid or basic Bessemer process this margin of difference in the cost will enable the manufacturer to incur any increased cost that may be incident to the duplex process and still produce his steel at a less cost than it can be done at Pittsburgh, with the same character of plant and equipment. If the basic open-hearth process is employed then there is no reason why the Southern manufacturer cannot produce a ton of ingots or billets as cheaply as his Northern brother using the same process, less the difference in the cost of the pig iron; and to this process I think the South should look for the best results, for the reason that the manufacture of open-hearth steel is being increased more rapidly to-day than that manufactured by any other process.

In the past, two obstacles have prevented the manufacture of open hearth steel in this section—one, the presence of an excessive amount of silicon in the iron, and the other, the absence of scrap. Both of these obstacles have been removed by the Talbot Process, which will cheaply remove all the silicon, thus obviating the necessity for the use of scrap.

If these facts are true, then there is no reason why the South should not commence at once to convert a large percentage of its present output of pig iron into steel, except the lack of enterprise or the admission that we have not the capacity to do what others have done, not only in England, France and Germany, but are doing successfully in this country north of the Ohio River.

That it will take a large outlay of money to construct and start a plant of sufficient capacity to do this work successfully is admitted; but while this is true, the returns would be so great to the section making the investment that it is confi-

dently asserted that any one of the large railroad systems traversing this section could afford to make the entire outlay, and would get a large return on the investment from the indirect benefits it would derive from the plant, if it never received \$1 of direct returns. Birmingham or Chattanooga could afford to build a steel plant with a capacity of 500 tons per day, and give it to any man who would operate it, and make money from the investment from the increased population it would necessarily bring and the large number of manufacturing establishments that would inevitably seek a location near such works.

The demand for such a plant is so imperative and the benefits to accrue are so great that it seems incomprehensible that some united effort is not made in this direction. The longer it is delayed the greater the difficulty in starting it, for the reason that our neighbors north of the Ohio River are taking advantage of the fact that nothing has been done in this direction in the South, and they are pushing development west of Pittsburgh with a view of supplying, not only the whole of the great Northwest, but also reaching down and supplying the consumer in the South and Southwest. Recently a company for the erection of a large steel plant has been organized at Youngstown, Ohio, and another large mill has been started at Indianapolis. The effect of these plants is being felt in stimulating the production of pig iron along the Lake Coasts all the way from Buffalo to Duluth.

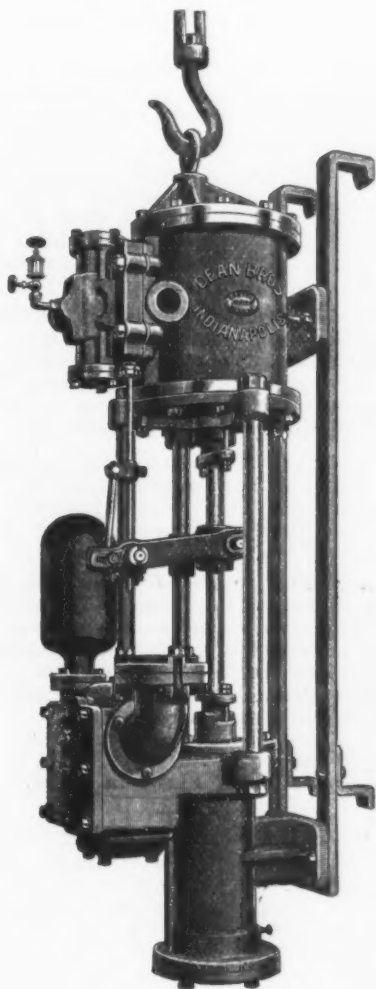
Twenty years ago the manufacture of steel in the United States was practically an untried experiment. The whole product of the furnaces was either sold for foundry purposes or puddled and sold in the form of rails, bars, &c. With the introduction of the Bessemer process for the manufacture of steel, a new element was injected into the iron business. At first, while the price was very high, the manufacture of steel did not spread rapidly, for the reason that in addition to its high cost and the large amount of capital required to successfully manufacture steel, the area of the then known steel ores was limited. Notwithstanding these facts the superior quality of steel for all purposes as compared to wrought iron was so patent that the manufacturers in the North who had the foresight and money to appreciate this fact prosecuted its development until to-day they are able to produce a ton of steel at a less price than they can produce a ton of bar iron.

A. Sanstrom & Co. of Chicago, architectural iron manufacturers, made an assignment on the 15th inst. The failure came in the form of five judgments filed at noon in the Circuit Court. Each confession is on a judgment note, and the aggregate is \$34,510.30. They are in favor of the following concerns and for the following amounts: Pennsylvania Iron and Coal Company, \$860.47; George W. Leighton, \$26,750; Forsyth, Hyde & Co., \$3,880.70; the Douglas Furnace Company, \$543.61; Forsyth, Hyde & Co., \$2,365.52. The concern is not a corporation, but a firm composed of August and Charles F. Sandstrom. Their foundry is located at LaSalle and Root streets, where a large number of men are employed. A. Sandstrom & Co. are an old Chicago firm, and were supposed to be on a sound financial basis.

It is stated that a movement is on foot at Youngstown, Ohio, to have the new labor organization known as the National Union of Iron and Steel Workers abandoned because it will undoubtedly greatly injure the Amalgamated Association. A meeting for the purpose of taking action on this matter will be held at Youngstown some time during this week.

The Dean Vertical Sinking Pump.

This pump, made by the Dean Brothers Steam Pump Works of Indianapolis, Ind., is intended for use in mines, shafts, pits, or in any place where a portable pump is required. It is a single-cylinder, direct-acting pump, and being double-acting it throws a continuous stream. It can be operated suspended by a hoist or attached to the side of the shaft. The valve gear is noiseless and is provided with an adjustable stroke which has proved to be an admirable device for operating the valves of steam pumps. They are made with a view to withstanding the rough usage to which they are subjected and are suitable for permanent use in mines. When necessary, the water cylinder is made of gun metal or bronze to resist the action of



The Dean Vertical Sinking Pump.

bad mine water. All pumps of this type are made with parts interchangeable. The pump shown in the illustration has steam cylinder 14 inches and pump cylinder 8 inches in diameter, stroke 12 inches, section 6 inches, and discharge 5 inches.

G. W. Doolittle has invented a perforated metallic street crossing that is now being tested at the intersection of Van Buren and Jackson streets with State street, Chicago. The sections of the crossing are 3 feet long and 17 inches wide, and are laid across the street just as the ordinary stone crossings are laid. The advantage of the perforated crossing is that the water and slush that usually accumulate in rainy weather about the crossings run through and are drained into a sewer by a trough underneath. The crossings now in use on State street are made of cast iron, but in future the sections will be made of rolled steel about

half an inch thick reinforced underneath. It is claimed the new crossing can be made and laid ready for use at a less cost than the ordinary stone crossing. The crossing will be made by a new corporation, the Perforated Metallic Street Crossing Company, with a capital of \$100,000, and the manufacture of the crossings will soon begin. Frank M. Potter, Henry F. Hoepfner and William Wilhartz are interested in the company.

WORLD'S FAIR NOTES.

Foreign Exhibitors Will Fill Their Space.

Intelligence was received last week from 13 foreign countries indicating that intending exhibitors abroad are taking all the space they can secure. A few days ago Chief Fearn cabled all foreign commissioners and governments to notify him at once as to their plans, and, if possible, send lists of intending exhibitors. This was coupled with the statement that if information was not furnished immediately the space previously allotted would be withdrawn.

From Berlin Imperial Commissioner Wermuth cabled quickly: "Exhibitors' list forwarded. Our courts will be compactly filled; all space is needed. Any diminution of allotment would upset the plans upon which Germany is now prepared to participate. I protest against any reduction."

Following this came a message from the President of the Russian Imperial Commission saying: "All allotments of space are certain to be compactly filled; do not reduce us." Switzerland, through Consul A. Hollinger, replied that every foot of the Swiss section, nearly 6000 square feet, would be occupied. Spain's message was brief. It said: "Keep space assigned by telegram." From Canada was received a message announcing that full particulars relating to the Canadian exhibit would be forwarded at once.

Norway, through Commissioner-General Ravn, promised full and complete occupation of all space assigned to that country. The Exposition Committee in Christiania, he said, was doing splendid work, and Norway would make an extensive display. Denmark wired: "Plans sent on; all space needed." Equally brief was this message from Sweden: "Sending plans; exhibitors' list ready."

Only four or five governments have thus far begun building their state pavilions. Among these are Germany, France, England and Japan. England's building is nearly completed, Germany's is well under way, and the Japanese workmen are progressing rapidly on the temple, which is to remain permanently in Jackson Park.

Interest in England continues to increase. Information was received that the Lord Mayor of London intends to visit Chicago next year. He has also formed what is styled a Loan Committee, with headquarters at the Mansion House, London. Through the efforts of this organization a number of valuable works of art from London and different municipalities throughout England will be collected and forwarded to the exposition.

May Be Lighted Up.

Everything now indicates that the exposition will be opened nights the greater part of every week during the period of the World's Fair. Although the Board of Directors at a meeting held a few weeks ago adopted rules closing the exposition at 7 o'clock, this was only done as a tentative measure. At that time the board did not know what might be the best policy to pursue. The rule was sent to the National Commission, then in session, and it

was adopted by the latter body because the directors desired it should be. There was a clause in the rule providing that the exposition be kept open nights on special days. It is likely that these special days will be so amplified as to mean practically continuous night opening.

Apparently a mistaken idea has arisen in regard to the number of buildings to be lighted and the cost of such service. Persons who visited the Paris Exposition of 1889 and the one held previous to it say there is no occasion for lighting all of the buildings. At night people will go to the exposition to see the sights and hear music, but not to study exhibits. Consequently, if the Art Building, the Horticultural Building, the Manufactures and Electricity Buildings were lighted the public would be satisfied with lighting so far as building are concerned. These structures contain exhibits which are interesting in themselves without the operation of machinery or explanation by guides or the servants of exhibitors.

Great interest will necessarily center about the Grand Basin east of the Administration Building. Here will be a stretch of water 300 feet wide, with its sides illuminated by electricity. At its western extremity will be two electric fountains surpassing, it is said, in every detail of beauty anything that has been seen. They will throw streams of water 150 feet high, and be illuminated with beautifully blended combinations of colors. Then there will be bands of music distributed through the grounds, so that sight and sense shall be gratified.

Quarters for the Officials.

Quarters for Director-General Davis and his staff were fixed upon last week. The northeast pavilion of the Administration Building will be used. On the ground floor Chief Fearn of the Department of Foreign Affairs with his assistants will have rooms. The first floor above will be occupied by the Council of Administration, President Higinbotham, and the Secretary and clerical force of the Board of Directors. On the second floor rooms will be prepared for the Director-General and his personal staff. On the third floor will be offices for the Department of Publicity and Promotion and special quarters for the Chicago press. Offices for the National Commission have not been allotted, but will be apportioned after consultation with President T. W. Palmer. It was thought advisable to use only one wing of the building this winter in order to avoid the expense of heating. When the removal of the city office takes place it will include all the departments with the exception of the one under Secretary R. J. Murphy of the Press and Printing committee, and Secretary John T. Dickinson of the National Commission.

Exhibit of an Appliance for Cooking by Electricity.

The woes of the long-suffering housekeeper are now about to vanish. The comforts of home are to be secured without any of its worries. Coal and its disagreeable effects and even the death-dealing gas are to be supplanted with electricity for the purpose of cooking as well as lighting. A steak is to be ready for table 30 seconds after it is laid on the bar through which the electric fluid will flow. And even if it be a steak purchased by the gentle boarding-house keeper, it is warranted to be so tender, and smoking, and juicy that it will tempt the veriest gourmand. It is one of the peculiarities of the cooking process that the steak, while being done to a turn, will preserve that which is lost under present conditions. Moreover, it becomes temptingly puffed, and at the touch of the knife the blessings of the new device are seen.

These are the claims made for an invention which will be seen during the World's Fair. James P. Williams, representing the owners of the invention, the Electric Forging Company of Boston, has secured space for the display of the new device. In addition to this exhibit there will be one of another process by the same company, which is to supersede coal or gas for heating iron and steel in rolling mills. Altogether, the exhibit will give a good illustration of the advance which is daily being made in the matter of electrical appliances.

Great Statue of the Republic.

The largest statue ever made in America is practically finished. It is the statue of the Republic, and it stands just inside the archway entrance of the Grand Basin at the World's Fair grounds. If, as some of the great scientists of the day are endeavoring to prove, our Mother Eve was 200 feet in height, one can get a fair idea of her supremely beautiful and imposing stature by a look at this magnificent statue. It is not so high as they are trying to maintain Eve was, but it is high enough to give a good idea of what she looked like. Imagine a woman 65 feet tall, with a figure that is absolutely perfect in its symmetry. Every line and curve, every measurement of length and girth in accordance with the ideas of the old Grecian sculptures. In a word, a Venus, though a modestly draped one, 12 or 15 times the stature of the most beautiful women that adorn the earth.

The pedestal on which the statue of the Republic stands is built in the water. It is 35 feet high to the base of the statue, so that from a height of about 100 feet the representative of freedom looks out on the Exposition Buildings.

The site of the statue is directly in front of the Administration Building. The arms and hands are upraised toward the head. In her right hand she holds a globe on which an eagle rests with outspread wings. The left hand grasps a pole on top of which is a liberty cap. The symbol of the globe and eagle is that Liberty invites the nations of the earth to live under the form of government which our eagle symbolizes. The globe is invitingly held forth under the fostering shelter of the eagle's wings.

The left arm and hand is stretched upward to its utmost length and lifts the pole and liberty cap high above the head to imply that the Republic holds liberty paramount to everything else.

The features of the statue wear a look of proud contentment and happiness, as if there was nothing left to be desired in her existence. A laurel wreath rests on the head, with the topmost leaves approaching nearly to a point above her forehead. The hair is arranged in a heap at the back of the head after the fashion of the Grecian models.

The drapery of the statue lays in heavy folds on the arms and shoulders and falls in graceful curves on the sides. The bust is covered with armored shields, and on the bosom rests an eagle with wings outstretched. A corsage envelops the waist, and from it depends a chain which holds a sword on the right side of the figure. The drapery hangs in close folds from the corsage to the feet.

In harmony with the beautiful buildings which surround the Grand Basin the statue is of true classic build. Between it and the Statue of Liberty which stands in New York harbor there is a striking resemblance. The latter holds up a torch of electric lights as the symbol of enlightenment for the world, that in the Grand Basin uplifts the symbols of the republic. The statue here will have a diadem of electric lights when it is completed. Just now workmen are building a house around the figure, not so much to protect it from

the weather as to enable the men to give it the finishing touches.

The statue was designed by Daniel C. French of New York, and was put up under the supervision of C. B. Atwood, the chief designer of the Exposition.

The head, neck and arms of the figure are to be finished in old ivory after the copies of the famous statues of Jupiter and Minerva, by Phidias. The rest of the form and drapery will be of bronze or gilt. The statues of Phidias had eyes of precious stones, but the diadem of the republic will outshine them.

From the chin to the top of the head is 15 feet, and the arms are 30 feet long. It takes a measure about 24 feet long to go around the head and hair, and the nose is 30 inches in length. It is possible for four men to find sitting room on the hand of the statue, and it would take a wedding ring 10½ inches in diameter to fit her finger. The length of the forefinger is 45 inches. There is a stairway through the inside of the figure, and the man who will attend to the electric lights in the diadem will clamber up a ladder in the lady's neck and out through a doorway in the crown of her head.

Wisconsin's Brownstone Monolith Quarried.

The huge brownstone monolith for the World's Fair was broken from its bed on the 18th inst. at the quarries of the Prentice Brownstone Company at Houghton. It is carved out of a solid bed of brownstone. A hundred wedges were placed on either side. A large party of citizens from Ashland and some from Bayfield witnessed the quarrying. The iron wedges were placed about ten inches apart on both sides of the stone, which was cut loose from the walls. Dr. Ellis mounted the stone and delivered an address. The stone will be transported to Chicago by ship early next spring. It is the largest single stone ever quarried, and is an event in modern quarrying without a precedent. Mr. Prentice is already at work on four more monoliths 25 feet in height to go with this monster.

First Souvenir Coin Sold for \$10,000.

Several weeks ago it was announced that the Remington Typewriter Company had offered \$10,000 for the first souvenir coin. At that time it was thought by many that the offer was not *bona fide* and that the money would never be given. The offer has been accepted by the Exposition Company, the money has been paid, and the Remington people hold a contract for the first coin.

Now that the deal has been completed, the Exposition Company can claim the honor of having sold a coin for the highest price ever paid. The transaction also gives the entire issue of coins a higher value, and the exposition expects to dispose of at least 1,000,000 pieces before January 1. Bids are now being received for the last coin, and it is understood that the Remington people have an ambition to also be possessed of this.

Freight Cars Unloaded Daily.

More than 100 freight cars are run into Jackson Park and unloaded every day. The daily arrival of freight cars in the neighborhood of the park is from 500 to 800. Within 60 days it is expected that 1000 cars will be the daily average of arrivals, and that it will be necessary to handle at least 400 of these within the grounds. There are now 17 miles of track within the fences of Jackson Park, and 40,000 ties will have been used when the last rail is put down. The latest improved interlocking system is being used for the switches. The yards will hold 1200 freight cars or 700 passenger coaches when the terminal is completed.

Items.

An "official bulletin" will be printed during the World's Fair by the morning newspapers of Chicago. The paper will be published at Jackson Park, and each newspaper will be given one page. The remainder of the bulletin will contain official news, including announcements by the exposition management. Afternoon papers will be published by the *Evening Post* and the *Evening News*.

Austria will erect a highly decorated pavilion in the Manufactures Building for a showing of Austrian exhibits. The structure will be 65 feet high, 120 feet long and 30 feet deep. Raphael Kube, from Vienna, has been commissioned by the Austrian Government to look after arrangements for the pavilion, and intends to make the exhibit of his country one of the most attractive in the Manufactures Building.

India has decided to contribute to the exposition a representative collection of timber and other forest products.

The Krihbiel Palace Car Company have applied for track space, 450 feet long by 10 feet wide, in the Department of Transportation. It is proposed to show six passenger coaches, each 75 feet long, and readily convertible into parlor, sleeping, dining or apartment cars.

The Jackson-Sharpe Company of Wilmington, Del., have entered, as transportation exhibits, 65 open passenger cars to be operated on the intramural railway on the exposition grounds. Eighteen of these will be equipped with electric motors.

Work has commenced in driving piles and erecting steel pillars for the Krupp gun exhibit. The location is just south of the Monastery of La Rabida, between the Casino and the Forestry Building.

According to the *Reichsanzeiger*, the official organ of the German Government, Commissioner Wermuth and his associates will leave for Chicago the end of November. The term for the transportation of Germany's exhibits is fixed for the months of December and January.

Detection of Flaws in Metal.

According to the French journal *L'Illustration*, some very satisfactory experimental trials have recently been made for the purpose of testing a new instrument designed to detect the presence of hidden cavities or flaws in metal. This instrument, known as the "Schizophone," is the invention of Captain Louis de Place, and is a very ingenious application of the telephone, depending for its action upon the resonance incident to sound in cavernous spaces. Availing himself of the principle of the microphone in order to magnify the result sufficiently, M. de Place has produced an instrument which turns to practical use the effect produced by the transmission of sound through varying media, a device enabling the ear to detect with certainty the presence in metal of fissures and imperfections hidden from the eye.

In use, under normal conditions, with blows falling mechanically, through the operation of a suitable device upon metal of uniform quality, this combined application of the telephone and the microphone yields a sound of a constant intensity. By the manipulation of a simple appliance, the sound may be reduced in volume at will until entire silence results, and this will continue so long as the metal surface which is struck covers an interior which does not vary in character. But if the striking device, in the course of its exploration, should encounter any part beneath which there is a defect, resonance results, causing the instrument to yield a

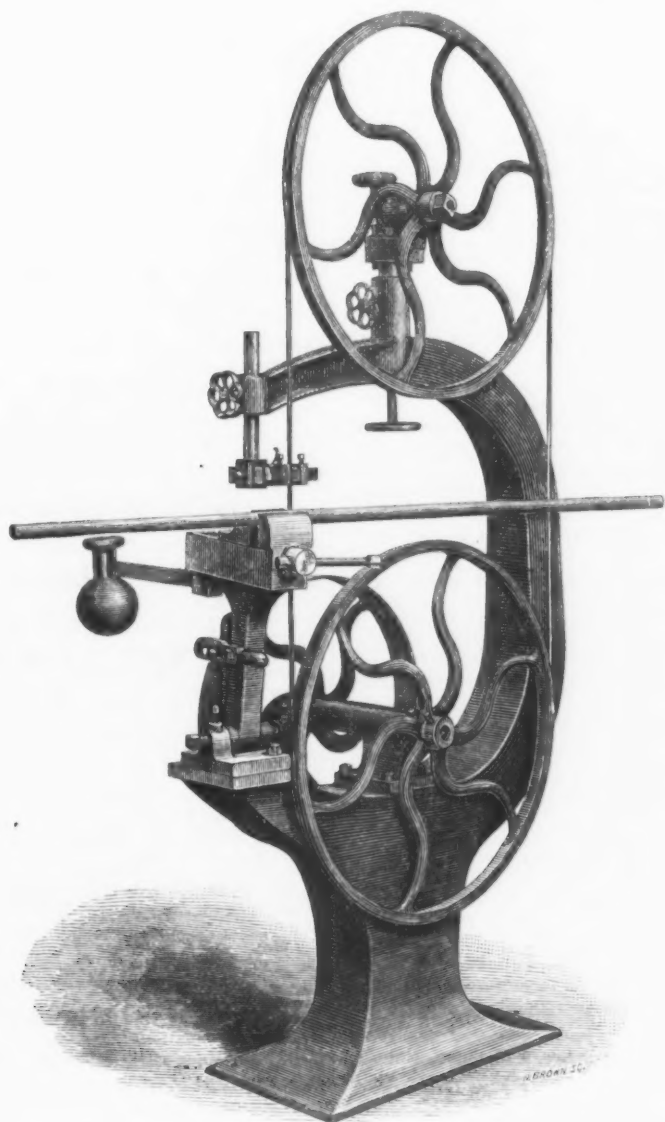
sound which indicates the existence of the hidden flaw.

It is well known that the presence of a slight defect within the interior of a mass of metal may, under conditions of great vibration or sudden torsional strain, lead to most disastrous results. Should the new instrument for the detection of such unsuspected flaws fulfill in actual service the promise of its trials thus far, it is destined to prove of great practical importance in the manufacture of guns, rails, axles, shafting, &c. For use in connection with all ordnance work and particularly for naval purposes, its value, if its reliability be demonstrated, will be ap-

that in every case where imperfections were indicated the reliability of the instrument was demonstrated by the revelation of defects apparent upon breaking the rails at the points brought under suspicion by the schizéophone.

Band Saw for Metals.

The accompanying illustration shows a general view of a band saw for cutting metal, manufactured by G. W. Griffin & Co. of Franklin Falls, N. H., and sold by C. E. Jennings & Co., 79 Reade street, New York City. The saw is provided



BAND SAW FOR METALS.

parent at once, since it will not only increase the reliability of the battery, but will insure the maximum of destructive effect for the limited quantity of armor-piercing shell which can be carried by a vessel of war. Such projectiles frequently have hidden from sight within their walls, and often defying detection by the unaided ear when they are struck by a hammer, flaws which form in the process of making, with the result of causing the shell to break up against armor instead of piercing it.

The experimental trials which are reported to have shown such promising results were conducted at Ermont, in France, under the auspices of a French railroad company. A large number of rails were subjected to test, and it is stated

with a vise for holding the rods, bars or other stock which requires to be cut. This vise is adjustable, so that by swinging the jaw slightly out of line the rods to be cut pass in front of the back run of the saw, and stock may be cut to any length desired. The saw is also provided with a table, held in the jaws of the vise, for use in cutting up sheet metals, and also for general band-saw work. The manufacturers point out that by means of the saw guide the saw may be turned out of line with the face of the wheel and at right angles with the jaws of the vise when used for cutting up long stock. By means of the adjustment of the guide, the saws may also be prevented from running and a square cut secured. The feed is automatic, and adjusts itself to the amount of

metal to be cut. Special claims are made for the temper of these saws, which is said to reduce the liability of breakage to a minimum. Three grades of saws are made for large work, ordinary stock cutting and for sheet metal or any stock less than $\frac{3}{16}$ inch thick.

The Jenkins Tinning Machine.

The first of the new Jenkins tinning machines ever used in this country has just been placed at the tin-plate works of Gummey, Spering & Co., Philadelphia, where it was put in operation at the beginning of the present week. It is reported to work most successfully and to possess the requisites of simplicity, effectiveness and labor saving in a very satisfactory degree. Its work is rapidly done and very thorough.

The machine—a Welsh invention—has been before the trade for about 12 months, and is stated to have been introduced with admirable success in several Welsh establishments, including the tin-plate works of Griffiths, Davies & Co. at Glanyrafon and Rosser's Tin Plate Factory at Cilfryw. The machine at Gummey, Spering & Co.'s is operating on bright plates, of which its capacity is 60 boxes for each day of 10 hours.

The contrivance consists of the usual two metal pots with an automatic device for handling the sheets, passing them through the whole process in a remarkably short space of time. The black plates are fed at one end into the first metal pot, through the palm-oil flux, with a fork. From this pot the sheet is shipped on to an automatic table which tilts down to receive it; it here is allowed to drain and cool to the necessary degree, when the sheet is dropped by another motion of the table on to iron fingers which seize and push it into a cradle in the finishing pot, which is placed at a lower level. Here it is again dipped and by an upward motion of the cradle the plate is then passed between a set of rollers, passing upward through another bath of oil, and emerging a finished tin plate ready for the bran box. The whole operation is automatically performed by a half turn of a handle placed at the side of the machine. All parts are put into action, so that two or three sheets are being passed through the various stages at once, and a constant procession can be kept up uninterruptedly. A large Jenkins machine is, we hear, now being placed in the new tin plate works of the Phillips Tin Plate Company, at Wayne Junction, Philadelphia.

An attempt is making to unite all the building trades in our principal cities under the jurisdiction of the Knights of Labor. The scheme has already been acted upon in New York, New Jersey and Brooklyn, and is now under consideration in Boston. It is the plan of the parties pushing this undertaking to have a subdivision of each trade, with a district assembly in which every subdivision shall be represented by delegates. All technical questions, such as those of wages and hours of labor, will be regulated by each trade; but all matters affecting the general interests of every branch of the industry, such as the ordering of strikes, resisting reductions of wages or a lockout, will be acted on by the district assembly. By this method it is thought the autonomy of the trades will be preserved, and at the same time the entire industry can be brought into line whenever such a proceeding might be necessary.

The Aliquippa Natural Gas Company of Beaver, Beaver County, Pa., were granted a charter of incorporation last week, with a capital stock of \$5000.

The Exhibitors.

LIST OF THE AMERICAN EXHIBITORS OF MACHINERY, HARDWARE AND IRON AND STEEL.

The management of the World's Columbian Exposition has completed its task of allotment of space to American Manufacturers. Of the total of 5,272,045 square feet that was asked for only 1,369,290 was found available. Of this the Manufacturers' Department has received 1,101,497; the Machinery has 898,872; Transportation, 620,000; Liberal Arts, 595,392; Mines, 514,547; Electricity, 480,000; Agriculture, 450,665; Horticulture, 301,473; Ethnology, 200,079, and Fisheries, 44,360. The Agricultural and Horticultural Departments have also received certain outdoor space. The complete official list is not yet available. From a report covering 18,000 names we take the following:

American Wrench Co., Boston, Mass.
Ansonia Clock Co., Chicago.
Acme Boiler & Radiator Co., St. Paul.
Acme Machinery Co., Cleveland.
American Screw Co., Providence, R. I.
Aermotor Co., Chicago.
Avery & Sons, B. F., Louisville, Ky.
American Net & Twine Co., Boston.
Allis, The E. P. Co., Milwaukee, Wis.
Aultman & Taylor Co., Mansfield, Ohio.
American Leather Link-Belt Co., Chicago.
Advance Thresher Co., Battle Creek, Mich.
Atlas Engine Works, Indianapolis.
Abendroth & Root Mfg. Company, New York.
Aultman, C. & Co., Canton, O.
Ajas Forge Co., Chicago.
Allan Wood Co., Philadelphia.
Austin, F. C., Mfg. Co., Chicago.
American Road Machine Co., Kenneth Sq., Pa.
American Radiator Co., Chicago.
Ames, O. & Sons, North Easton, Mass.
American Shearer Mfg. Co., Nashua, N. H.
American Rubber Co., Boston.
Armstrong Mfg. Co., Bridgeport, Conn.
Altoona Mfg. Co., Altoona, Pa.
Ashton Valve Co., Boston.
Airbrush Mfg. Co., Rockford, Ill.
Ashtabula Tool Co., Ashtabula, Ohio.
American Well Works, Aurora, Ill.
Alaska Refrigerator Co., Muskegon, Mich.
Adams & Westlake Co., Chicago.
Auld & Conger, Cleveland.
American Harrow Co., Detroit, Mich.
American Saw Co., Trenton, N. J.
Atha & Hughes, Newark, N. J.
Acme Harvester Co., Pekin, Ill.
Atlas Tack Corporation, Boston.
American Heating Co., Beloit, Wis.
Ajax Iron Works, Corry, Pa.
Abendroth Bros., Port Chester, N. Y.
Algo-American Iron & Metal Co., New York.
Arcade Mfg. Co., Philadelphia.
Automatic Time Stamp & Regulator Co., Boston.
Alliance Mfg. Co., Alliance, Ohio.
Asbestos Specialty Mfg. Co., Buffalo, N. Y.
American Street Cleaning Machine Co., Sag Harbor, N. Y.
American Steam Heating Co., New York.
Automatic Spring Machine Co., New York.
American Tube Works, Boston.
Adamant Mfg. Co. of America, New York.
Ashley Engineering Co., Hawthorn, N. J.
American Instrument Co., Boston.
Accurate Time Stamp Co., New York.
American Pneumatic Tool Co., New York.
American Paper Pail & Box Co., 21 Rose st., New York.
American Writing Machine Co., Hartford, Conn.
Avery Planter Co., Peoria, Ill.
Amesbury Carriage Co., Amesbury, Mass.
American Car Co., St. Louis, Mo.
Automatic Refrigerator Ice & Machine Co., Lancaster, Pa.
Anderson Iron & Bolt Co., Anderson, Ind.
American Cart Co., Kalamazoo, Mich.
American Tube & Iron Co., 50 South Canal st., Chicago.
Ariel Cycle Mfg. Co., Goshen, Ind.
Albany Horse Nail Co., Albany, N. Y.
American Nut Lock Co., 211 Biddle st., St. Louis, Mo.
Ashland Coal & Iron Railroad Co., Ashland, Ky.
Aultman, Miller & Co., Akron, Ohio.
Atwood Machine Co., Stonington, Conn.
Anchor Buggy Co., Cincinnati, Ohio.
Acme Machine Co., Moline, Ill.
Adriance Machine Co., Plymouth and Jay sts., Brooklyn, N. Y.

American Oak Leather Co., Cincinnati, Ohio.
Archer & Pancoast Mfg. Co., 898 Broadway, N. Y.
Acme White Lead & Color Works, Detroit, Mich.
Allentown Foundry & Machine Co., Allentown, Pa.
Allentown Hardware Works, Allentown, Pa.
American Nickel Works, Camden, N. J.
Addyston Pipe and Steel Co., Cincinnati, Ohio.
American Bronze Co., 1411 Unity Building, Chicago.
Allentown Rolling Mills, Allentown, Pa.
American Vending Machine Co., 29 Murray st., N. Y. City.
American Cash Register Co., 108 Quincy st., Chicago.
Allen Paper Car Wheel Co., 627 Pullman Building, Chicago.
Alexander Brothers, 410 N. Third st., Philadelphia, Pa.
Ames Sword Co., 148 Monroe st., Chicago.
Acme Shear Co., Bridgeport, Conn.
Automatic Knitting Machine Co., Pawtucket, R. I.
Armstrong Bros. & Co., Pittsburgh, Pa.
Avery & Rouse Steam Thrasher Co., Peoria, Ill.
American Ship Windlass Co., Providence, R. I.
Atkins, E. C. & Co., Indianapolis, Ind.
American Eng. Co., Bound Brook, N. J.
Adriance, Platt & Co., Poughkeepsie, N. Y.
Ashcroft Mfg. Co., Bridgeport, Conn.
American Curling Iron Works, 72 Market st., Chicago.
Automatic Wind Engine Co., Buffalo, N. Y.
Acme End Gate Mfg. Co., 51 S. Jefferson st., Chicago.
Automatic Knife Co., Middletown, Conn.
Abbott Machine Co., 47 S. Canal st., Chicago.
Angle Lamp Co., 59 Park place, New York City.
American Machinery Co., Detroit, Mich.
American Magnetic Boiler Cleaning Co., 95 Fifth av., Pittsburgh, Pa.
Aitchison, The R. Perforated Metal Co., 265 Dearborn st., room 510, Chicago.
Accurate Time Stamp Co., 669 Hudson st., New York City.
American Sporting Goods Co., 316 W. Fourth st., St. Louis, Mo.
American Bolt and Rivet Co., 62 William st., New York City.
Berlin Machine Works, 60 S. Canal st., Chicago.
Batcheller & Sons Co., Wallingford, Vt.
Brady, F., Atlantic Hotel, Chicago.
Blanchards, P. Sons Co., Nashua, N. H.
Bass Foundry & Machine Co., Fort Wayne, Ind.
Binghamton Wagon Co., Binghamton, N. Y.
Bean, Chamberlain Mfg. Co., Hudson, Mich.
Bement, E. & Sons, Lansing, Mich.
Builders' Iron Foundry, Providence, R. I.
Buffalo Forge Co., Buffalo, N. Y.
Baldwin Refrigerator Co., Burlington, Vt.
Buckeye Engine Co., Salem, Ohio.
Bridgman, H. M., Blue Island, Ill.
Blake, The G. F., Mfg. Co., 25 Liberty st., N. Y.
Benham Steam Engine Co., 16 South Water st., Providence, R. I.
Banster, J. A., Co., 185 Washington st., Newark, N. J.
Brown & Sharpe Mfg. Co., Providence, R. I.
Brown, R. H. & Co., New Haven, Conn.
Barnett, G. & H., 21 Richmond st., Philadelphia, Pa.
Ball & Socket Fastener Co., 56 North Fourth st., Philadelphia, Pa.
Baeder, Adamson & Co., 182 Lake st., Chicago.
Baron Mch. Co., 211 South Charles st., Baltimore, Md.
Boal, C. T., Stove Co., 245 Kinzie st., Chicago.
Bradley, David, Mfg. Co., 63 North Desplaines st., Chicago.
Buck's Stove and Range Co., St. Louis, Mo.
Bridge & Beach Mfg. Co., 501 S. Main st., St. Louis, Mo.
Bullock, W. H., 303 Dearborn st., Chicago.
Boies Steel Wheel Co., Scranton, Pa.
Buffalo Steam Pump Co., Buffalo, N. Y.
Bissell Chilled Plow Works, South Bend, Ind.
Boomer & Boschert Press Co., 193 Lake st., Chicago.
Boston & Lockport Block Co., 162 Commercial st., Boston, Mass.
Bundy Mfg. Co., Binghamton, N. Y.
Borden & Selleck Co., 48 and 50 Lake st., Chicago.
Boyd Brake Co., Baltimore, Md.
Barnes, W. F. & J. Co., Rockford, Ill.
Barnum, E. T., Detroit, Mich.
Buffalo Woodworking Machine Co., Buffalo, N. Y.
Bonner, L., Brooklyn, N. Y.
Buchanan Fence Co., Smithville, Ohio.
Barney & Berry, Springfield, Mass.
Brown Cotton Gin Co., New London, Conn.
Bailey Oven Co., Mansfield, Mass.
Berger Mfg. Co., Canton, Ohio.
Bidwell G. R. Cycle Co., 310 West Fifty-ninth st., New York.
Buffalo Scale Co., Buffalo, N. Y.
Buffalo Cycle Works, Buffalo, N. Y.

Burgess Gun Co., 257 Washington st., Buffalo, N. Y.
Blair Co., Huntington, Pa.
Ball & Wood Co., 15 Cortlandt st., New York.
Battle Creek Machinery Co., Battle Creek, Mich.
Bills, A. O., 3015 Chestnut st., Philadelphia, Pa.
Brass & Iron Works Co., Fostoria, Ohio.
Burton Handle Co., Burton, Ohio.
Buffalo Spring & Gear Co., 1502 Niagara st., Buffalo, N. Y.
Bonney Rapid Vise Co., Marion, Ind.
Bridgeport Gun Implement Co., Bridgeport, Conn.
Brownell Car Co., 2300 North Broadway, St. Louis, Mo.
Beaudry Tool Co., 48 Congress st., Boston, Mass.
Bradford Belting Co., Cincinnati, Ohio.
Bodine Roofing Co., Mansfield, Ohio.
Bateman, E. S. & F., Greenloch, N. J.
Bangor Edge Tool Co., Bangor, Maine.
Bess Machine Co., Hamilton, Ohio.
Barlow Corn Planter Co., Quincy, Ill.
Buckeye Churn Co., Sydney, Ohio.
Burden Iron Co., Troy, N. Y.
Bevin Bros. Mfg. Co., East Hampton, Conn.
Bardsley, J., 59 Elm st., New York.
Bucyrus Steam Shovel & Dredge Co., Bucyrus, Ohio.
Brighton Stoker Co., 203 River st., Cleveland, Ohio.
Bostwick Metal Lath Co., Niles, Ohio.
Blakeslee, C. S., 1549 Wabash av., Chicago.
B B Wire Co., Indianapolis, Ind.
Blymyer Iron Works Co., Cincinnati, Ohio.
Blumenthal Bros. & Co., 44 North Third st., Philadelphia, Pa.
Babcock & Wilcox Co., 30 Cortlandt st., New York City.
Brainerd Milling Machine Co., Hyde Park, Mass.
Bath Iron Works, Bath, Maine.
Belmont Iron Works, Twenty-second st. and Wabash av., Philadelphia, Pa.
Bucket Pump Co., 441 Plum st., Cincinnati, Ohio.
Baragawanath, Wm. & Co., 48 W. Division st., Chicago.
Brown Bros. Mfg. Co., Clinton and Jackson sts., Chicago.
Buckeye Automatic Car Coupler Co., Columbus, Ohio.
Bullock Bellows Co., 140 Columbus st., Cleveland, Ohio.
Bowers, Galpin & Co., 203 State st., Binghamton, N. Y.
Bidwell Bean Thresher Co., Madison, N. Y.
Barton Bell Co., Marion, Ind.
Butler Hard Rubber Co., New York.
Backus Water Motor Co., Newark, N. J.
Buffalo Brass & Iron Bedstead Co., 105 Barton st., Buffalo, N. Y.
Boynton Furnace Co., 47 Dearborn st., Chicago.
Bliss, E. W. Co., Limited, 17 Adams st., Brooklyn, N. Y.
Brown, McClure & Wales, 83 Purchase st., Boston, Mass.
Bristol Mfg. Co., Waterbury, Conn.
Burnham, Williams & Co., Philadelphia, Pa.
Brooks Locomotive Works, Dunkirk, N. Y.
Bailey, C. J. & Co., 22 Boylston st., Boston, Mass.
Buck, Charles, Millbury, Mass.
Bass Foundry & Machine Works, Fort Wayne, Ind.
Barr Pumping Engine Co., Germantown Junction, Philadelphia.
Boughton, J. W., 1107 Chestnut st., Philadelphia, Pa.
Russ Machine Works, Grand Rapids, Mich.
Branson Machine Co., 506 St. John st., Philadelphia, Pa.
Bailey, J. T. & Co., 1138 Market st., Philadelphia, Pa.
Brown Bros. Mfg. Co., Chicago.
Blakeslee Mfg. Co., Duquoin, Ill.
Bell, Davis Steam Engine Works, Buffalo, N. Y.
Barry, W. B., Saw & Supply Co., Indianapolis, Ind.
Born Steel Plate Range & Mfg. Co., 128 Superior st., Cleveland, Ohio.
Burton Electrical Forging Co., 163 Oliver st., Boston, Mass.
Bissell Carpet Sweeper Co., Grand Rapids, Mich.
Bryan Mfg. Co., Bryan, Ohio.
Bohannon, Wilson, 760 Lexington av., Brooklyn, N. Y.
Bethlehem Iron Co., S. Bethlehem, Pa.
Binn's Patent Band Co., 5 Berks st., Philadelphia, Pa.
Besly, C. H. & Co., 10 N. Canal st., Chicago.
Boyd Brake Co., Baltimore, Md.
Bement, Miles & Co., Callowhill and Twenty-first st., Philadelphia.
Buckeye Buggy Co., Columbus, Ohio.
Boston Belting Co., 109 Madison st., Chicago.
Belding Mfg. Co., 223 Fifth av., Chicago.
Box, A. & Co., Front, Poplar and Canal sts., Philadelphia.
Baute Pulley Co., Benton Harbor, Mich.

- Canton Steel Roofing Co., Canton, Ohio.
 Crane Bros., Westfield, Mass.
 C. & C. Electric Motor Co., 402 Greenwich st., New York City.
 Cribben, Sexton & Co., 75 Lake st., Chicago.
 Crown Lubricator Co., 85 Dearborn st., Chicago.
 Crescent Steel Co., Pittsburgh, Pa.
 Consolidated Car Heating Co., Albany, N. Y.
 Cleveland Twist Drill Co., Cleveland, Ohio.
 Cleveland Stone Co., Cleveland, Ohio.
 Chicago Tire and Spring Co., Chicago.
 Case, J. I., T. M. Co., Racine, Wis.
 Capitol Mfg. Co., 125 Reese st., Chicago.
 Continental Iron Works, Brooklyn, N. Y.
 Crane Co., Chicago.
 Chicago Gas-Stove Co., 240 W. Lake st., Chicago.
 Chicago Raw-Hide Mfg. Co., Chicago.
 Cooke, L. M. Co., Paterson, N. J.
 Celluloid Zapon Co., 41 Barclay st., New York City.
 Cogswell Machine Co., Richmond, Va.
 Carnegie Steel Co., Ltd., Pittsburgh, Pa.
 Cycle Fitting Co., Indianapolis, Ind.
 Chicago Spring Truck Co., 491 Carroll av., Chicago.
 Chicago Automatic Scale Co., 217 Chamber of Commerce Building, Chicago.
 Cabot, S. Boston, Mass.
 Canton Steam Pump Co., Canton, Ohio.
 Chicago Bicycle Co., 250 Jackson st., Chicago.
 Columbian Pump and Machine Co., Columbus, Ohio.
 Champion Wagon Co., Oswego, N. Y.
 Cushion Car Wheel Co., Indianapolis, Ind.
 Cortland Mfg. Co., Ltd., Cortland, N. Y.
 Coburn Whip Co., Windsor, N. Y.
 Corbin & Kenyon, Owego, N. Y.
 Corbin, P. & F., New Britain, Conn.
 Clinton Wire Cloth Co., Clinton, Mass.
 Chicago Ship Building Co., Chicago, Ill.
 Clark Wire Co., 387 Illinois st., Chicago.
 Compress Wheel Co., 118 E. North avenue, Chicago.
 Chicago Fire Hose Co., 214 Northern Office building, Chicago.
 Crocker-Wheeler Electric Co., 430 W. Fourteenth st., New York City.
 Chicago Bicycle Co., Chicago.
 Cleveland Hardware Co., Cleveland, Ohio.
 Cardwell Machinery Co., Richmond, Va.
 Chapman Valve Mfg. Co., 24 W. Lake st., Chicago.
 Chicago Rapid Roofing Co., 28 Madison st., Chicago.
 Climax Road Machinery Co., Meridian, N. Y.
 Chandler & Taylor, Indianapolis, Ind.
 Canedy Mfg. Co., 1602 Ashland block, Chicago.
 Chicago National Filter Co., 277 State st., Chicago.
 Crane Machinery Co., Shepardstown, N. Y.
 Carroll Aluminum Mfg. Co., Meadville, Pa.
 Coventry Machinists' Co., 296 Wabash av., Chicago.
 Capitol Cash Register Co., Troy, N. Y.
 Curtis & Curtis, Bridgeport, Conn.
 Cameron, The A. S. Steam Pump Works, foot E. Twenty-third st., New York City.
 Chicago Naphtha Motor Co., 7339 Vincennes av., Chicago.
 Central Mfg. Co., 37 Armour st., Chicago.
 Cleveland Faucet Co., Cleveland, Ohio.
 Champion Mfg. Co., Richmond, Ind.
 Crane Co., 10 N. Jefferson st., Chicago.
 Chase Cotton Gin Co., Milford, Mass.
 Coburn Trolley Track Mfg. Co., Holyoke, Mass.
 Christy Knife Co., Fremont, Ohio.
 Clauss Shear Co., Fremont, Ohio.
 Carver Cotton Gin Co., E. Bridgewater, Mass.
 Chamberlain, H. S., Chattanooga, Tenn.
 Chadwick Two Wheeler Co., Salem, Va.
 Champion Blower & Forge Co., Lancaster, Pa.
 Combination Flue Boiler Co., 124 Second st., Milwaukee, Wis.
 Cripples' Revenge Threshing Machine Co., Cleveland, Ohio.
 Cleveland Frog & Crossing Co., Cleveland, Ohio.
 Creamer & Scott Co., Milton, Ind.
 Clapp Mfg. Co., E. D. Auburn, N. Y.
 Combined Saw & Planer Co., New York.
 Chapman Mfg. Co., Chicago, Ill.
 Cotaway Harrow Co., Higganum, Conn.
 Cowles Engineering Co., Brooklyn, N. Y.
 Continental Iron Works, Brooklyn, N. Y.
 Campbell Cutlery Co., Syracuse, N. Y.
 Central Iron & Steel Co., Brazil, Ind.
 Colwell Lead Co., 63 Centre st., New York City.
 Columbian Wagon Co., Columbia, Pa.
 Columbia Grey Iron Works, Columbia, Pa.
 Cowles Electric Smelting & Aluminum Co., Lockport, N. Y.
 Cleveland City Forge & Iron Co., Cleveland, Ohio.
 Connel & Douglas Machine Co., Mills st., Rochester, N. Y.
 Curtis Regulator Co., Boston, Mass.
 Collins & Co., Collinsville, Conn.
 Cresson, W. L., Norristown, Pa.
 Clark Carriage Co., Cincinnati, Ohio.
 Chicago Iron Works, Hawthorne Av. and Wil-low St., Chicago.
- Colt's Patent Fire Arms Mfg. Co., Hartford, Conn.
 Cordesman Machine Co., Butler St., Cincinnati, Ohio.
 Chapman Mfg. Co., Meriden, Conn.
 Chicago Fire-Proof Covering Co., 37 Michigan St., Chicago.
 Chicago Clothes Dryer Works, 65 South Canal St., Chicago.
 Cortwright Metal Roofing Co., Broadway and Hamilton St., Philadelphia, Pa.
 Consolidated Time Lock Co., 161 West Third St., Cincinnati, Ohio.
 Carey Safe Co., Ltd., Chicago and Scott Sts., Buffalo, N. Y.
 Chambers Bros. Co., Fifty-second St. and Lancaster Av., Philadelphia, Pa.
 Cooper, W. S., Brass Works, 442 North Thirteenth st., Philadelphia, Pa.
 Congdon Brake-Shoe Co., Phoenix Building, Chicago.
 Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.
 Chicago Stove Works, Chicago.
 Crosby Steam Gauge & Valve Co., 93 Oliver St., Boston, Mass.
 Chester Pipe & Tube Co., 267 South Fourteenth St., Philadelphia, Pa.
 Chattanooga Plow Co., Chattanooga, Tenn.
 Collins & Burgie Co., 261 Clinton St., Chicago.
 Co-operative Foundry Co., Rochester, N. Y.
 Coale Muffler & Safety Valve Co., Central Savings Bank, Baltimore, Md.
 Cummings Filter Co., 18 South Seventh St., Philadelphia, Pa.
 Cincinnati Tool Co., 231 Broadway, Cincinnati, Ohio.
 Chicago Horse Shoe Co., 720 Rookery Building, Chicago.
 Champion Iron Co., Kenton, Ohio.
 Central Cycle Mfg. Co., Indianapolis, Ind.
 Custer Beam Works, 2057 Marshall St., Philadelphia, Pa.
 Capitol City Fence Co., Indianapolis, Ind.
 Crescent Phosphorized Metal Co., 811 Fairmount Av., Philadelphia, Pa.
 Comstock-Castle Stove Co., Quincy, Ill.
 Channon Emery Stove Co., Quincy, Ill.
 Columbian Metallic Rod Pkg. Co., 726 Girard Av., Philadelphia, Pa.
 Cleveland Fence Co., Indianapolis, Ind.
 Cambria Iron Co., 218 South Fourth St., Philadelphia, Pa.
 Clark Bros. Brass Lamp & Copper Co., Trenton, N. J.
 Campbell & Zell Co., 25 South Gay St., Baltimore, Md.
 Crown Point Mfg. Co., Crown Point, Ind.
 Columbus Bolt Works, Columbus, Ohio.
 Cowles, C. & Co., New Haven, Conn.
 Canton Combination Lock Co., Canton, Ohio.
 Coldwell Lawn Mower Co., Newburgh, N. Y.
 Craver & Steel Mfg. Co., Harvey, Ill.
 Chicago Carriage Lamp Co., 86 Market St., Chicago.
 Cole Bros. Prong Plow Co., Greencastle, Ind.
 Crane Elevator Co., 219 South Jefferson St., Chicago.
 Common Sense Engine Co., Muncie, Ind.
 Columbian Cordage Co., Auburn, N. Y.
 Columbus Cement Co., Columbus, O.
 Collins Plow Co., Quincy, Ill.
- Detroit Stove Works, Detroit, Mich.
 Deering, W. & Co., Chicago.
 Defiance Machine Works, Defiance, Ohio.
 Darling, Brown & Sharpe, Providence, R. I.
 Detroit White Lead Works, Detroit, Mich.
 Daisy Implement Co., Pleasant Lake, Ind.
 Diamond Machine Co., Providence, R. I.
 Deming Co., Salem, Ohio.
 Diamond Prospecting Co., 15 North Clinton St., Chicago.
 Detrick & Harvey Machine Co., Baltimore, Md.
 Detroit Graphite Tool Co., Detroit, Mich.
 Dunn Edge Tool Co., Oakland, Maine.
 Diston, H. & Sons, Philadelphia, Pa.
 Draper, G. & Son, Hopedale, Mass.
 Deere & Co., Moline, Ill.
 Dowagiac Mfg. Co., Dowagiac, Mich.
 Dederick, T. K., & Co., Albany, N. Y.
 Dodge Mfg. Co., Mishawaka, Ind.
 Davis & Cook, Watertown, N. Y.
 Detroit Bridge and Iron Works, Detroit, Mich.
 Detroit Heating & Lighting Co., Detroit, Mich.
 Dickey, A. P., Mfg. Co., Racine, Wis.
 Deitz, R. E., Co., 25 Lake st., Chicago.
 Diamond Wrench & Tool Co., Portland, Me.
 Drexel Railway Supply Co., Rookery Building, Chicago.
 Davies Iron Works, Muskegon, Mich.
 DeLaval Separator Co., 610 Northern Office Building, Chicago.
 Detroit Lubricator Co., Dayton, Ohio.
 Dayton Fan & Motor Co., Dayton, Ohio.
 Driggs Ordnance Co., 700 Fourteenth st., N. W., Washington, D. C.
 Devlin, T., & Son, Third and Lehigh av., Philadelphia, Pa.
 Dalzell Axle Co., South Egremont, Mass.
 Daimler Motor Co., 111 East Fourteenth st., New York.
 Davis Corkscrew Co., Detroit, Mich.
 Diether & Barrows, Fort Wayne, Ind.
- Dover Foundry and Machine Works, Dover, N. H.
 Duplex High Speed Engine Co., 215 Superior st., Chicago.
 Deere & Mansur Co., Moline, Ill.
 Davis & Farber Machine Co., North Andover, Mass.
 Dangler Stove Mfg. Co., Cleveland, Ohio.
 Dawes & Myler, New Brighton, Pa.
 Decker Portable House Co., 229 Broadway, New York.
 Dubuque Stamping & Enameling Works, Dubuque, Iowa.
 Deal, H. M., Co., Bucyrus, Ohio.
 Detroit Electric Works, Detroit, Mich.
 Detroit Graphite Mfg. Co., Detroit, Mich.
- Enterprise Mfg. Co., Philadelphia, Pa.
 Empire Drill Co., Shortsville, N. Y.
 Eldridge, E. H., & Co., Indianapolis, Ind.
 Eagle Lock Co., Terryville, Conn.
 Edgar Mfg. Co., Reading, Mass.
 Eddy Valve Co., Waterford, N. Y.
 Eureka Gate Co., Waterloo, Iowa.
 Engineering Equipment Co., 143 Liberty st., New York.
 Eagle Machine Co., Lancaster, Ohio.
 Eureka Tempered Copper Co., North East, Pa.
 Elastic Tip Co., 152 Lake st., Chicago.
 Elliott Hickory Cycle Co., Newton, Mass.
 Emerson, Talcott & Co., Rockford, Ill.
 Empire Chain Works, Bradlee & Co., Philadelphia, Pa.
 Erie City Iron Works, 34 Monroe st., Chicago.
 Excelsior Iron Roofing Co., Aurora, Ind.
 Economist Plow Co., South Bend, Ind.
 Erie Car Heating Co., Erie, Pa.
 Exeter Machine Works, Exeter, N. H.
 Electrical Forging Co., 163 Oliver st., Boston, Mass.
 Egan Co., Cincinnati, Ohio.
 Empire Cross Spring Co., Janesville, Wis.
 Emerson & Fisher Co., Cincinnati, Ohio.
 Excelsior Harrow Co., Big Springs, Ohio.
 Ensign Mfg. Co., Huntington, W. Va.
 Ely, T. J., Mfg. Co., Girard, Pa.
 Electric Road Carriage Co., 95 Milk st., Boston, Mass.
 Electric Cutlery Co., Newark, N. J.
 Emerson Power Scale Co., 12 Post Office Square, Boston, Mass.
 Esterly Harvesting Machine Co., White-water, Wis.
 Elgin Wind Power and Pump Co., Elgin, Ill.
 Evans & Heuling, Haddonfield, N. J.
 Erwin-Welch Hydraulic Machine Co., Chicago, Ill.
 Erie City Iron Works, Erie, Pa.
 Enterprise Carriage Co., Miamisburg, Ohio.
 Electric Secret Service Co., New York.
 Electric Engineering & Supply Co., Syracuse, N. Y.
 Electric Heat Alarm Co., Boston, Mass.
 Enterprise Mfg. Co., Columbiana, Ohio.
 Elmendorf Water Closet Apparatus Co., New London, Conn.
 Eagle Machine Works Co., Indianapolis, Ind.
 Electric Machine Co., Chicago, Ill.
 Eddy Electric Mfg. Co., Windsor, Conn.
 Empire Knife Co., West Winsted, Conn.
 Electricron Metal Co., New York.
 Eureka Mower Co., Utica, N. Y.
 Eureka Door Bell Co., Boston, Mass.
 Empire State Pulley Works, Fulton, N. Y.
 G. M. Eddy & Co., Brooklyn, N. Y.
 Ensign Mfg. Co., Chicago, Ill.
 Eclipse Corn Planter Co., Enfield, N. H.
 Edge Moor Bridge Works, Edge Moor, Del.
 Excelsior Spring Co., Excelsior Springs, Mo.
 Elliott Car Co., Gadsden, Ala.
 Electrical Mfg. Co., Philadelphia, Pa.
 Emmons Metal Co., New York.
 Eureka Fire Hose Co., New York.
 Eclipse Water Filter Co., Philadelphia, Pa.
 Edison, Thomas A., Orange, N. J.
- Fuller & Warren Co., Milwaukee, Wis.
 Farquhar, A. B. & Co., York, Pa.
 Foss Mfg. Co., Springfield, Ohio.
 Field Engineering Co., New York.
 Fraser & Chalmers, Chicago, Ill.
 French, A., Spring Co., Pittsburgh, Pa.
 Frick Coke Co., Scottdale, Pa.
 Ferracute Machine Co., Bridgeton, N. J.
 Fire Extinguisher Mfg. Co., Chicago, Ill.
 Fay, J. A. & Co., Cincinnati, Ohio.
 Flint & Walling Mfg. Co., Kendallville, Ind.
 Fox Machine Co., Grand Rapids, Mich.
 Flexible Door & Shutter Co., Worcester, Mass.
 Farrell Foundry & Machine Co., Ansonia, Conn.
 Fitchburg Steam Engine Co., Fitchburg, Mass.
 Fisher Clarke, Trenton, N. J.
 Fuel Economizer Co., New York.
 Field Water Purifier Co., Chicago, Ill.
 Franklinport Crane & Hoist Co., Franklin, Pa.
 Falls Rivet & Machine Co., Cuyahoga Falls, Ohio.
 Fulton Iron & Engine Works, Detroit, Mich.

Farquhar Heating Co., Chicago, Ill.
 Flint Wagon Co., Flint, Mich.
 Fairbanks, E. & T. & Co., St. Johnsbury, Vt.
 Flint Road Cart Co., Flint, Mich.
 Field Force Pump Co., Lockport, N. Y.
 Florence Zinc Co., Philadelphia, Pa.
 Farmers' Friend Mfg. Co., Dayton, Ohio.
 Freeport Bicycle Mfg. Co., Freeport, Ill.
 Flagg, Stanley G., & Co., Philadelphia, Pa.
 Fitch Gear Co., Rome, N. Y.
 Fry, H. A., & Co., Philadelphia, Pa.
 Fox Solid Pressed Steel Co., Joliet, Ill.
 Fairbanks & Co., A. C., Boston, Mass.
 Front Rank Steel Furnace Co., St. Louis, Mo.
 Frictionless Metal Co., Chattanooga, Tenn.

Greenlee Bros. & Co., Chicago, Ill.
 Gloucester Isinglass & Glue Co., Gloucester, Mass.
 Gormully & Jeffery Mfg. Co., Chicago, Ill.
 Grant Locomotive Works, Chicago, Ill.
 Gates Iron Works, Chicago, Ill.
 Griffen Wheel & Foundry Co., Chicago, Ill.
 Gorton & Lidgerwood Mfg. Co., Chicago, Ill.
 Glennon & Krause, Chicago, Ill.
 Gaar, Scott & Co., Richmond, Ind.
 Griswold Mfg. Co., Erie, Pa.
 Greeley, E. S. & Co., New York.
 Goetz-Mitchell Co., New Albany, Ind.
 Gould Car Heating Co., Chicago, Ill.
 Goshen Sweeper Co., Grand Rapids, Mich.
 Graves, A. W. & Sons, Middleton Springs, Vt.
 Gale Mfg. Co., Albion, Mich.
 Garvin Machine Co., New York.
 Gas Fuel, Power and Light Co., Philadelphia, Pa.
 Graham, Emlen & Passmore, Philadelphia, Pa.
 Grand Rapids Wheelbarrow Co., Grand Rapids, Mich.
 Grand Rapids Refrigerator Co., Grand Rapids, Mich.
 Garrison, A., Foundry Co., Pittsburgh, Pa.
 Geneva Carriage Co., Geneva, N. Y.
 Gordon Steam Pump Co., Hamilton, Ohio.
 Griffing, A. A., Iron Co., Jersey City, N. J.
 Gandy Belting Co., Baltimore, Md.
 Gong Bell Mfg. Co., Easthampton, Conn.
 Gould Coupler Co., Buffalo, N. Y.
 Grand Rapids Mfg. & Implement Co., Grand Rapids, Mich.
 Globe Iron Works Co., Cleveland.
 Gurney Hot Water Heating Co., Boston.
 Goulds Mfg. Co., Seneca Falls, N. Y.
 Gleason Tool Co., Rochester, N. Y.
 Gilbert & Bennett Mfg. Co., Chicago.
 Grass, H., Philadelphia.
 Gas Engine & Power Co., New York.
 Gendron Iron Wheel Co., Toledo, Ohio.
 Goodsell Packing Co., Chicago.
 Geneva Tool Co., Geneva, Ohio.
 Gordon Hollow Blast Grate Co., Greenville, Mich.
 Grilley Co., New Haven, Conn.
 Gaston, Weston & Ladd, New York.
 Grand Rapids Cycle Co., Grand Rapids, Mich.
 Goodsue Wind Engine Co., St. Charles, Ill.
 Goodell Co., Antrim, N. H.
 Great Western Electric Supply Co., Chicago.
 Gould & Eberhardt, Newark, N. J.
 Golden State & Mines' Iron Works, San Francisco.
 Gessert Co., C. F., New York.

Heath & Milligan Mfg. Co., Chicago, Ill.
 Hoosier Drill Co., Richmond, Ind.
 Hercules Iron Works, Chicago, Ill.
 Horton, The E., Sons Co., Windsor Locks, Conn.
 Hackney Hammer Co., Cleveland, Ohio.
 Hoopes & Townsend, Philadelphia, Pa.
 Herendeen Mfg. Co., Geneva, N. Y.
 Hamilton Mfg. Co., Chicago, Ill.
 Horton Mfg. Co., Bristol, Conn.
 Hartford Cycle Co., Hartford, Conn.
 Howells Mining Drill Co., Plymouth, Pa.
 Huyett & Smith Mfg. Co., Detroit, Mich.
 Hand-made Saw Blade Mfg. Co., Chicago, Ill.
 Hoffmann, Jacob, Wagon Co., Cleveland, Ohio.
 Harlan & Hollingsworth Co., Wilmington, Del.
 Huber Mfg. Co., Marion, Ohio.
 Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
 Henney Buggy Co., Freeport, Ill.
 R. Hoe & Co., New York.
 Hawes, J. A. & Son, Johnstown, Pa.
 Holdfast Hook Co., Philadelphia, Pa.
 Hunter Arms Co., Fulton, N. Y.
 Hotchkiss, J. P., New York.
 Hilles & Jones Co., Wilmington, Del.
 Heller Bros., Newark, N. J.
 Hunt, C. W. & Co., New York.
 Hancock Inspirator Co., Boston, Mass.
 Home Iron Works, Chicago, Ill.
 Hill Clutch Works, Cleveland, Ohio.
 Heine Safety Boiler Co., St. Louis, Mo.
 Hendryx, the A. B. Co., New Haven, Conn.
 Herb and Co., Fremont, Ohio.
 Hopson & Chapin Mfg. Co., New London, Conn.
 Harrison Safety Boiler Works, Germantown Junction, Pa.
 Hendey Machine Co., Torrington, Conn.
 Hoff, John D., Asbestos Co., San Diego, Cal.

Hope Electric Appliance Co., Providence.
 Hartford Machine Screw Co., Hartford, Conn.
 Holley Mfg. Co., Lockport, N. Y.
 Hall Mowing Machine Co., Portland, Maine.
 Hogan Boiler Co., New York.
 Howe Scale Co., Rutland, Vt.
 Hornellsville Iron Works, Hornellsville, N. Y.
 Havenville Mining & Mfg. Co., Havenville, Ohio.
 Handy Washing Machine Co., Muncie, Ind.
 Howard Iron Works, Buffalo.
 Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
 Hodges Steel & Iron Construction Co., Detroit, Mich.
 Hercules Mining Machine Co., Pittsburgh.
 Hooper, W. E. & Sons, Baltimore.
 Henley Machine Tool Works, Richmond, Ind.
 Hoopes & Townsend, Philadelphia.
 Hayes Pump & Planer Co., Galva, Ill.
 Hall & Carpenter, Philadelphia.
 Hanson & Van Winkle Co., Chicago.
 Hurd Refrigerator Co., Duluth, Minn.
 Hussey, T., North Berwick, Maine.
 Hart & Crouse, Utica, N. Y.
 Hutchins Refrigerator Car Co., Chicago.
 Hensch & Dromgold, York, Pa.
 Howe Pump & Engine Co., Indianapolis.
 Huey, M. S. & Son, Indianapolis.
 Hale & Kilburne Mfg. Co., Philadelphia.
 Hide Leather & Belting Co., Indianapolis.
 Harrisburg Foundry & Machine Works, Harrisburg, Pa.
 Holmes & Edwards Silver Co., Bridgeport, Conn.
 Howe, Brown & Co., Pittsburgh.

Iowa Farming Tool Co., Fort Madison, Ia.
 Indurated Fiber Pipe Co., Mechanicsville, N. Y.
 Ingersoll Milling Machine Co., Rockford, L. I.
 Illinois Steel Co., Chicago, Ill.
 Indiana Bicycle Mfg. Co., Indianapolis, Ind.
 Illinois Bolt & Nut Co., Carpentersville, Ill.
 Ide, A. L. & Son, Springfield, Ill.
 Ivins-Ellwood Tube Works, Philadelphia, Pa.
 Ingersoll-Sergeant Drill Co., New York.
 Improved Process Glue Co., Gloucester, Mass.
 Indianapolis Elbow Co., Indianapolis, Ind.
 Indianapolis Stove Co., Indianapolis, Ind.
 Insinger & Co., Philadelphia, Pa.
 Instantaneous Water Heater Co., Chicago, Ill.
 Illinois Alloy Co., Chicago, Ill.
 Illinois Fluor-Spar and Lead Co., Chicago, Ill.
 Ives, Blakeslee & Williams Co., Bridgeport, Conn.
 International Register Co., Chicago, Ill.
 Ives, H. B., & Co., New Haven, Conn.
 Ironclad Mfg. Co., New York.
 Ideal Mfg. Co., New Haven, Conn.
 Ironclad Stove Polish Co., Middletown, Conn.
 Indiana Insulated Wire & Rubber Co., Jonesboro, Ind.
 Industrial Works, Bay City, Mich.
 Ithaca Drop Forge Co., Ithaca, N. Y.
 Ide Wrench Co., Troy, N. Y.

Jewett, Sherman S., & Co., Buffalo, N. Y.
 Jeffrey Mfg. Co., Columbus, Ohio.
 Jones & Lamson Machine Co., Springfield, Vt.
 Jackson & Sharpe Co., Wilmington, Del.
 Johnson Co., Johnstown, Pa.
 Jack Frost Freezer Co., New York.
 Johnson Railroad Signal Co., Rahway, N. J.
 Jarecki Mfg. Co., Erie, Pa.
 Jenney Electric Motor Co., Indianapolis, Ind.
 Jones & Laughlins, Chicago, Ill.
 Jenkins Bros., New York.
 Jewett Belting Co., Hartford, Conn.
 Jewett Supply Co., Boston, Mass.
 Jones National Fence Co., Columbus, Ohio.
 Johnston Harvester Co., Batavia, New York.
 Johns, H. W., Mfg. Co., New York.
 Jennings, C. E. & Co., New York.
 Jewett, The J. C. Mfg. Co., Buffalo, N. Y.
 Josef, E. E., Mfg. Co., Buffalo, N. Y.

Keystone Farm Machine Co., York, Pa.
 Kennedy Wire Nail Machine Co., Chicago, Ill.
 Keystone Driller Co., Beaver Falls, Pa.
 Kentucky Fire Brick Co., Portsmouth, Ohio.
 King Rock Drill Co., Pittsburgh, Pa.
 Kestner, C. & Co., Chicago, Ill.
 Kirwan Electric Ind. Co., Wilkesbarre, Pa.
 Kent, S. W., Meriden, Conn.
 Kalamazoo R. R. Velocipede & Car Co., Kalamazoo, Mich.
 Kalamazoo Pulley Co., Kalamazoo, Mich.
 Knowles Loom Works, Worcester, Mass.
 Kernan Furnace Co., Utica, N. Y.
 Keeley Stove Co., Columbia, Pa.
 Kohler, Hayssen & Stehn Mfg. Co., Sheboygan, Wis.
 Kellogg, E. L. & Co., New York.
 Kitson Machine Co., Lowell, Mass.
 Knapp & Cowles Mfg. Co., Bridgeport, Conn.
 King Bridge Co., Cleveland, Ohio.
 Kingery Mfg. Co., Cincinnati, Ohio.
 Kelsey Furnace Co., Syracuse, N. Y.
 Kennedy Valve Mfg. Co., New York.

Kellogg Seamless Tube & Mfg. Co., Findlay, Ohio.
 Kearney & Foot Co., 102 Reade st., New York.
 Kenwood Mfg. Co., 253 South Canal st., Chicago.
 Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
 Krom, S. R., 136 Liberty st., New York.
 Keep, W. J., Detroit, Mich.
 Klotz & Bromer Machine Co., Sandusky, Ohio.
 King Mfg. & Implement Co., 31 Johnston Bldg., Cincinnati, Ohio.
 Keen & Hagerty, Baltimore, Md.
 Knowles, S. T., Pump Works, 93 Liberty st., New York.
 Lodge & Davis Machine Tool Co., Cincinnati, Ohio.
 Lufkin Rule Co., Saginaw, Mich.
 Landers, Frary & Clark, New Britain, Conn.
 Leffel, The James Co., Springfield, Ohio.
 Lape, W. E., 142 Lake st., Chicago.
 La France Fire Engine Co., Elmira, N. Y.
 Lansing Wheelbarrow Co., Lansing, Mich.
 Lima Machine Works, Lima, Ohio.
 Larrabee, The, Machine Co., 105 Summer st., Boston, Mass.
 Leffingwell, C., 55 Eighth ave., Newark, N. J.
 Lidgerwood Mfg. Co., 34 Monroe st., Chicago.
 Lefever Arms Co., Syracuse, N. Y.
 Lehmaier, Schwarz & Co., 37 Bleecker st., New York City.
 Lamson Store Equipment Co., 40 Water st., Boston, Mass.
 Lighthouse, J. C., Rochester, N. Y.
 Liberty Machine Works, 54 Frankfort st., New York City.
 Lozier Mfg. Co., Central ave., Toledo, N. Y.
 Lozier, H. A. & Co., 340 Superior st., Cleveland, O.
 Lowentraut, P., Newark, N. J.
 Lehigh Zinc and Iron Co., Philadelphia, Pa.
 Lever & Grundy, Philadelphia, Pa.
 Lalance & Grosjean Mfg. Co., 19 Cliff st., New York City.
 La Crosse Plow Works, La Crosse, Wis.
 Lovell, the J. P. Arms Co., Boston, Mass.
 Lobdell Car Wheel Co., Wilmington, Del.
 Lunkenheimer Brass Mfg. Co., Cinn., O.
 Lloyd, W. J. Mfg. Company, Twenty-second and Washington aves., Philadelphia, Pa.
 Levant Emery Co., 280 Broadway, N. Y.
 Lamson Consolidated Store Service Co., 89 State st., Boston, Mass.
 Lexington Gear Works, Lexington, Mass.
 Leatheroid Mfg. Co., Kennebunk, Maine.
 Loomis Gas Machinery Co., Hartford, Conn.
 Long & Alstatter Co., Hamilton, Ohio.
 Leib Machine Works, 23 Vandewater st., New York.
 Lowell Machine Shop, Lowell, Mass.
 Leach Roaster & Baker Co., Faxon, Ill.

McCormick Harvesting Machine Co., Chicago.
 McCaffrey File Co., Philadelphia.
 McConway & Turley Co., Forty-eighth st. and A. V. R. R., Pittsburgh, Pa.
 McKee, Fuller & Co., Catsaquia, Pa.
 Morgan, D. S. & Co., Brockport, N. Y.
 Marion Steam Shovel Co., Marion, Ohio.
 Moffett Journal Bearing Co., 514 Phoenix Building, Chicago.
 Morris, Tasker & Co., 222 So. Third st., Philadelphia, Pa.
 Miller Lock Co., Philadelphia, Pa.
 Moline Plow Co., Moline, Ill.
 Minnesota Thresher Co., Stillwater, Minn.
 Morris Machine Works, Baldwinville, N. Y.
 Meyer, Sniffen & Co., 46 Cliff street, New York City.
 Michigan Washing Machine Co., Muskegon, Mich.
 Myers, The H. M. Co., Beaver Falls, Pa.
 Mellert Foundry & Machine Co., Reading, Pa.
 Minneapolis Fire Arms Co., Bank of Minnesota Building, Minneapolis.
 Medart Patent Pulley Co., 39 South Canal st., Chicago, Ill.
 Manchester Locomotive Works, Manchester, N. H.
 McLagon Foundry Co., New Haven, Conn.
 Milwaukee Gas Stove Co., 49 Second st., Milwaukee, Wis.
 Michigan Stove Co., Detroit, Mich.
 Meriden Britannia Co., Meriden, Conn.
 Myers, F. E. & Bro., Ashland, Ohio.
 Marseilles Mfg. Co., Marseilles, LaSalle, County, Ill.
 Manhattan Silver Plate Co., Lyons, N. Y.
 Michigan Railway Supply Co., Detroit, Mich.
 Monticello Wire Co., Charlottesville, Va.
 Morton Safe Heating Co., Baltimore, Md.
 McGowan, The J. H., Co., 46 Canal av., Cincinnati, Ohio.
 March-Brownback Stove Co., Linfield, Pa.
 Myers & Ervien, Ogontz, Pa.
 Moseley & Co., Elgin, Ill.
 Mercury Pulley Facing Co., 26 North Seventh st., Philadelphia, Pa.
 Mast, Focs & Co., Springfield, Ohio.
 Magnesia Sectional Covering Co., Amber, Pa.

- Merchant & Co., 517 Arch st., Philadelphia, Pa.
 Menasha Wood Split Pulley Co., Menasha, Wis.
 Metric Metal Co., Erie, Pa.
 Mason, V. W. & Co., Providence, R. I.
 Moore, J. E., Danville, Pa.
 Michigan Scoop Co., 75 South Jefferson st., Battle Creek, Mich.
 Madison Car Co., Madison, Ill.
 Maydole, D., Hammer Co., Norwich, N. Y.
 Middleton, E. H., Sheet Iron Construction Co., 6 Fetter Lane, Philadelphia.
 Miller the W., Range & Furnace Co., Cincinnati, Ohio.
 Moore, the Franklin Co., Winsted, Conn.
 Moore Filter Co., Holyoke, Mass.
 Monarch Cycle Co., 42 North Halsted st., Chicago.
 Marion Cycle Co., Marion, Ind.
 Marion Novelty Works, Marion, Ind.
 Meyers, F. J., Mfg. Co., 419 Madison st., Covington, Ky.
 McClave, B., Scranton, Pa.
 Manville, B. & Co., New Haven, Conn.
 McShane, H., Mfg. Co., Baltimore, Md.
 Morgan Engine Co., Alliance, Ohio.
 McMillan Sash Balance Co., 56 Sixteenth st., Pittsburgh, Pa.
 Monumental Bronze Co., Bridgeport, Conn.
 McIntosh, Huntington Co., Cleveland, Ohio.
 Monroe Refrigerator Co., Lockland, Ohio.
 Munson Belting Co., 36 South Canal st., Chicago.
 Magic Freezer Co., 501 Home Insurance Building, Chicago.
 Metal Stamping Co., New York City.
 Mason Air-Brake and I. Co., Chicago.
 Mallory, Wheeler Co., New Haven, Conn.
 Mason Regulator Co., Boston, Mass.
 McKinnon Dash & Hardware Co., Buffalo, N. Y.
 Miller Grate Co., 100 Euclid ave., Cleveland, Ohio.
 Maryland Steel Co., Sparrow's Point, Md.
 Maris Machine Co., 2343 Callowhill st., Philadelphia, Pa.
 Miller Keyless Lock Co., Kent, Ohio.
 Mount Carmel Machine and Pulley Co., Mount Carmel, Ill.
 Munson Bros., Utica, N. Y.
 Monroe Mfg. Co., Monroe, Mich.
 Mentzel Machine Co., Baltimore, Md.
 Magee Furnace Co., 32-38 Union st., Boston, Mass.
 Meter Register Co., 52 Illinois st., Chicago.
 Marlin Fire Arms Co., New Haven, Conn.
 Morgan, D. F., Boiler Co., 23 West Lake st., Chicago.
 Munger-Colton Mfg. Co., 142 Lake st., Chicago.
 Michigan Radiator & Iron Mfg. Co., Detroit, Mich.
 Milwaukee Harvester Co., 155 Huron st., Milwaukee, Wis.
 Miller, F. & Sons, 349 West Twenty-sixth st., New York.
 Mast, P. P. & Co., Springfield, Ohio.
 Mitchell & Lewis Co., Racine, Wis.
 Mott, The J. L. Iron Works, 311 Wabash av., Chicago.
 Matchless Metal Polish Co., 82 to 88 South Market st., Chicago.
 Morse Twist Drill & Machine Co., New Bedford, Mass.
 Morse, Williams & Co., 1105 Frankford av., Philadelphia, Pa.
 N. W. Horse Nail Mfg. Co., Chicago.
 National Tube Works Co., McKeesport, Pa.
 National Ladder Co., Clyde, Ill.
 New England Butt Co., Providence, R. I.
 Norton Bros., 36 River st., Chicago.
 Narragansett Machine Co., Providence, R. I.
 National Association Tool Manufacturers, Tacony, Philadelphia, Pa.
 Nason Mfg. Co., 71 Beekman st., New York City.
 Norwich Nickel and Brass Works, Norwich, Conn.
 National Hot Water Heater Co., 34 Dearborn st., Chicago.
 Nonesuch Fiber Co., Newark, Del.
 Northampton Emery Wheel Co., Leeds, Mass.
 Nevius & Haviland, 500 West Forty-second st., New York City.
 Nicholson File Co., Providence, R. I.
 National Machine Works, Sheffield and North av., Chicago.
 New York Belting & Packing Co., 151 Lake st., Chicago.
 New York Central Iron Works Co., Geneva, N. Y.
 National Scale Co., 39 West Washington st., Chicago.
 National Machinery Co., Tiffin, Ohio.
 New York Air Brake Co., 115 Broadway, New York City.
 Newport News Ship Building & Dry Dock Co., 1 Broadway, New York City.
 New York Car Wheel Works, Buffalo, N. Y.
 Norwegian Plow Co., Dubuque, Iowa.
 Nichols & Shepard Co., Battle Creek, Mich.
 Novelty Iron Works, Dubuque, Iowa.
 Non-Exhausting Engine Co., 2108 Waverly place, St. Louis, Mo.
 Niagara Stamping & Tool Co., Buffalo, N. Y.
 National Liquid Measure Co., 721 Oxford Building, Chicago.
 Norton Door Check & Spring Co., 505 Sears Building, Boston, Mass.
 Newell, C. L., 26 South Water street, Cleveland, Ohio.
 New England Roller Grate Co., 65 Federal st., Boston, Mass.
 New York Safety Steam Power Co., 30 Cortlandt st., New York.
 Mail City Stamping Co., Wheeling, W. Va.
 Negus, T. S. & J. D., 140 Water st., New York.
 National Meter Co., Brooklyn, N. Y.
 National Malleable Castings Co., Cleveland, Ohio.
 National Water Tube Boiler Co., New Brunswick, N. J.
 National Iron Works, New Brunswick, N. J.
 Newark Machine Co., Columbus, Ohio.
 Northfield Knife Co., Northfield, Conn.
 Naumkeag Buffing Machine Ass'n, Beverly, Mass.
 New England Pin Co., Winsted, Conn.
 New Departure Bell Co., Bristol, Conn.
 National Water Tube Boiler Co., New Brunswick, N. J.
 National Iron Works, New Brunswick, N. J.
 New Process Nail Co., Torrington, Conn.
 New Haven Clock Co., New Haven, Conn.
 Newton Machine Tool Works, Twenty-fourth and Wood sts., Philadelphia, Pa.
 National Cash Register Co., Dayton, Ohio.
 New Era Gas-Fuel Appliance Co., 2626 Shields av., Chicago.
 Norton Emery Wheel Co., Worcester, Mass.
 National Barrow & Truck Co., 82 Fulton st., New York City.
 National Cordage Co., 24 Sherman st., Chicago.
 New Lechner Mining Machine Co., 171 W. State st., Columbus, Ohio.
 Nevins, The Laura, Range & Heating Co., Hotel Brevoort, Chicago.
 National Metal Edge Box Co., 621 Cherry st., Philadelphia, Pa.
 National Car Spring Co., room 57, 115 Broadway, New York City.
 Narragansett Machine Co., Providence, R. I.
 New York Insulated Wire Co., 15 Cortlandt street, New York City.
 Norton & Jones Machine Tool Works, Plainville, Conn.
 N. W. Stove Repair Co., 231-233 West Twelfth st., Chicago.
 Nordyke & Marmon Co., Indianapolis, Ind.
 National Hollow Brake Beam Co., Chicago.
 Newman Clock & Mfg. Co., Bridgeport, Ohio.
 Nash, D. H. & Co., Millington, N. J.
 Norwalk Iron Works, South Norwalk, Conn.
 National Lathe Turning Co., Scranton, Pa.
 Niles Tool Works, Hamilton, Ohio.
 Oswego Indurated Fibre Co., Oswego, N. Y.
 Osborne, H. F. Co., 44 Hill st., Newark, N. J.
 Oneida Community, Limited, Kenwood, Madison County, N. Y.
 Oil Well Supply Co., Pittsburgh, Pa.
 Otto Gas Engine Works, 151 Monroe st., Chicago.
 Overman Wheel Co., Chicopee Falls, Mass.
 Otis Steel Co., Limited, 406 Phoenix Building, Chicago.
 Olsen, Tinius & Co., 500 North Twelfth st., Philadelphia, Pa.
 Ohio Tool Co., 63 North Scioto st., Columbus, Ohio.
 Olmsted, L. H., Hasbrouck Heights, N. J.
 Osborne, C. S. & Co., Newark, N. J.
 Ott, D. W. Mfg. Co., Indianapolis, Ind.
 O'Connor Hame Fastener Co., 222 Waverly place, New York.
 Ohio Cultivator Co., Bellevue, Ohio.
 Otis Bros. & Co., 36 Park Row, New York City.
 Ohio Wagon Co., Muncie, Ind.
 Orange Judd Co., 52 Lafayette Place, New York City.
 Oliver Iron & Steel Co., Pittsburgh, Pa.
 Otis Elevating Railway Co., Catskill, N. Y.
 Otis Mfg. Chuck Co., Oneida, N. Y.
 Oil Fuel Heat & Power Co., Admore, Pa.
 Old Dominion Copper Co., Globe, Ariz.
 Peninsular Stove Co., Detroit, Mich.
 Fairpoint Mfg. Co., New Bedford, Mass.
 Parry Mfg. Co., Indianapolis, Ind.
 Pekin Plow Co., Pekin, Ill.
 Farlin & Orendorff Co., Canton, Fulton County, Ill.
 Pope Mfg. Co., 291 Wabash av., Chicago.
 Pike Mfg. Co., Pike Station, Grafton Co., N. H.
 Pullman Sash Balance Co., Rochester, N. Y.
 Pittsburgh Reduction Co., 95 Fifth av., Pittsburgh, Pa.
 Peters Cartridge Co., Cincinnati, Ohio.
 Positive Lock Washer Co., 291 Railroad av., Newark.
 Pennsylvania Machine Co., 31 North Seventh st., Philadelphia, Pa.
 Praul Rotary Steam Engine Co., 216 South Seventh st., Philadelphia, Pa.
 Portsmouth Wheel Co., Portsmouth, Ohio.
 Porter, J. E., Ottawa, Ill.
 Port Huron Engine and Thresher Co., Port Huron, Mich.
 Pech Mfg. Co., Sioux City, Iowa.
 Powell, The W. Co., Spring Grove av., Cincinnati.
 Parker Bros., Meriden, Conn.
 Parker, The Chas. Co., Meriden, Conn.
 Page, The W. H., Boiler Co., Norwich, Conn.
 Palmer, I. E., Middletown, Conn.
 Payson Mfg. Co., 1319 West Jackson st., Chicago, Ill.
 Pettee Machine Works, Newton Upper Falls, Mass.
 Piqua Handle Mfg. Co., Piqua, Ohio.
 Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
 Pittsburgh Brass Co., Allegheny City, Pa.
 Patch, A. H., Clarksville, Tenn.
 Putnam Nail Co., Neponset, Boston, Mass.
 Post, C. C. Burlington, Vt.
 Pierce, Butler & Pierce Mfg. Co., 96 Lake st., Chicago.
 Plumb, Fayette R., Philadelphia, Pa.
 Page Belting Co., Concord, N. H.
 Philadelphia Drop Forge Co., American and York sts., Philadelphia, Pa.
 Providence Steam Engine Co., Providence, R. I.
 Frybail, Paul, 512 W. Forty-first st., New York City.
 Pratt & Whitney Co., Hartford, Conn.
 Pittsburgh Locomotive & Car Works, Pittsburgh, Pa.
 Porter, H. K. & Co., Pittsburgh, Pa.
 Pugh, J. T., 3112 Market st., Philadelphia, Pa.
 Prentice Bros., Worcester, Mass.
 Princess Plow Co., Canton, Ohio.
 Pelton Water Wheel Co., 121 Main st., San Francisco, Cal.
 Penberthy Injector Co., Detroit, Mich.
 Paige Car Wheel Co., Cleveland, Ohio.
 Peck Bros. & Co., 259 Wabash av., Chicago.
 Petroleum Heat & Light Co., Adrian, Mich.
 Pottstown Iron Co., Pottstown, Pa.
 Plano Mfg. Co., 83 W. Monroe st., Chicago.
 Priestman & Co., 150 S. Third st., Philadelphia, Pa.
 Powerville Felt Roofing Co., 134 Maiden lane, New York.
 Pease, J. F., Furnace Co., Syracuse, N. Y.
 Pittsburgh Testing Laboratory, 95 Fifth av., Pittsburgh.
 Pittsburgh Railway Signal Co., corner Fifth av. and Woodward st., Pittsburgh, Pa.
 Peoria Steel & Iron Co., Peoria, Ill.
 Peninsular Metal Works, Detroit, Mich.
 Powers Duplex Regulator Co., 36 Dearborn st., Chicago, Ill.
 Portland Screen Co., Portland, Maine.
 Pneumatic Pencil Co., 709 Quincy st., Chicago.
 Pittsburgh Washing Machine Co., 100 Fifth av., Pittsburgh, Pa.
 Phoenix Iron Works, Meadville, Pa.
 Pratt & Letchworth, Buffalo, N. Y.
 Perkins, H. H., Mfg. Co., Kewanee, Ill.
 Pittsburgh Pressed Steel Co., Pittsburgh.
 Pitt's Agr. Works, Buffalo.
 Peck, Stow & Wilcox Co., Southington, Conn.
 Pease, E. H., Mfg. Co., Racine, Wis.
 Port Huron Eng. & Thresher Co., Port Huron, Mich.
 Perfection Scale Co., Cortland, N. Y.
 Peck Cash Register Co., Syracuse, N. Y.
 Pioneer Fireproof Construction Co., Chicago.
 Penna. Steel Co., Steelton, Pa.
 Pond Machine Tool Co., Plainfield, N. J.
 Peckhen Motor, Truck & Wheel Co., Kingston, N. Y.
 Q. & C. Co., Chicago.
 Reading Stove Works, Reading, Pa.
 Rathbone, Sard & Co., Chicago.
 Richards & Boynton Co., Chicago.
 Resor, W. & Co., Cincinnati.
 Richard & Bechtold, Bellaire, Mich.
 Rand Drill Co., New York.
 Roebling's, J. A., Sons & Co., Trenton.
 Roots, The P. H. & M. F. Co., Connersville, Ind.
 Rhode Island Tool Co., Providence, R. I.
 Russell & Erwin Mfg. Co., New Britain, Conn.
 Russia Cement Co., Gloucester, Mass.
 Rhode Island Locomotive Works, Providence, R. I.
 Riehle Bros. Testing Machine Co., Philadelphia.
 Racine Cement & Pipe Co., Racine, Wis.
 Russell & Co., Massillon, Ohio.
 Roland, W. H., Frankford, Phila.
 Rood Magic Scale Co., Chicago.
 Rogers & Hamilton Co., Chicago.
 Rock Island Plow Co., Rock Island, Ill.
 Reading Hardware Co., Reading, Pa.
 Rogers Locomotive & Machine Works, Paterson, N. J.
 Ransom & Smith Co., San Francisco.
 Reeves Pulley Co., Columbus, Ind.
 Riverview Iron Works, Bordentown, N. J.

- Rhode Island Perkins Horseshoe Co., Providence, R. I.
 Rochester File Co., Rochester, N. Y.
 Randolph & Clowes, Waterbury, Conn.
 Rider Engine Co., New York.
 Rouse, R. R., Indianapolis.
 Risdon Iron & Locomotive Works, San Francisco.
 Rouse, Hazard & Co., Peoria, Ill.
 Ruble American Blower & Injector Co., Newark, N. J.
 Reinforced Rail Joint Co., Boston.
 Ridgway Furnace Co., Boston.
 Rochester Cycle Co., Rochester, N. Y.
 Reed & Barton, Taunton, Mass.
 Roberts, Throp & Co., Three Rivers, Mich.
 Reed, F. E. & Co., Worcester, Mass.
 Russell, Wheeler Co., Utica, N. Y.
 Ripley Washboard Mfg. Co., Ripley, Ohio.
 Ross & Co., E. W., Springfield, Ohio.
 Red Jacket Mfg. Co., Davenport, Iowa.
 Royal Cycle Works, Marshall, Mich.
 Richards, The T. C. Hardware Co., West Winsted, Conn.
 Rouse, Durvea Cycle Co., Peoria, Ill.
 Rogers & Bro., Waterbury, Conn.
 Reynolds Mfg. Co., The James, New Haven, Conn.
 Racine Wagon & Carriage Co., Racine, Wis.
 Rogers Iron Co., Springfield, Ohio.
 Rochester Athenæum Machine Works, Rochester, N. Y.
 Ross Valve Co., Troy, N. Y.
 Rockford Bit Co., Kokomo, Ind.
 Richmond Locomotive and Machine Works, Richmond, Va.
 Rubber Step Mfg. Co., Exeter, N. H.
 Rowley & Hermance Co., Williamsport, Pa.
 Read, W. & Sons, 107 Washington st., Boston.
 Rousseau's Electrical Works, 310 Mott ave., N. Y.
 Railway Supply Foundry Co., corner West Twenty-first st. and Center av., Chicago.
 Remington Arms Co., Ilion, N. Y.
 Richmond Cedar Works, Richmond, Va.
 Robinson Machine Co., Altoona, Pa.
 Spring Garden Metal Works, Philadelphia, Pa.
 Standard Tool Co., Cleveland, Ohio.
 South Bend Iron Works, South Bend, Ind.
 Shirk, The G. M., Mfg. Co., 112 and 114 Lake st., Chicago.
 Stanley Rule & Level Co., New Britain, Conn.
 Simonds Mfg. Co., 69 Lake st., Chicago.
 Sandwich Mfg. Co., Sandwich, Ill.
 Simpson, Hall, Miller & Co., Wallingford, Conn.
 Spiedel, J. G., Reading, Pa.
 Superior Drill Co., Springfield, Ohio.
 Sturtevant, B. F. Co., Boston, Mass.
 Smith's, R. R., Axle Grease Co., 301 N. Charles street, Baltimore.
 Steam Engine Works, Buffalo, N. Y.
 Sheldon Axle Co., Wilkes-Barre, Pa.
 Studebaker Bros. Mfg. Co., South Bend, Ind.
 Schutte, L. & Co., Twelfth and Thompson sts., Philadelphia, Pa.
 Seely Mfg. Co., Detroit, Mich.
 Skandia Plow Co., Rockford, Ill.
 St. Louis Well & Machine Tool Co., St. Louis, Mo.
 Standard Mfg. Co., Pittsburgh, Pa.
 Singer, Nimick & Co., Pittsburgh, Pa.
 Syracuse Stove Works, Syracuse, N. Y.
 Shriver T. & Co., 333 E. Fifty-sixth st., New York city.
 Steam Gauge & Lantern Co., 25 Lake st., Chicago.
 Sioux City Engine Works, Sioux City, Iowa.
 Syracuse Chilled Plow Works, Syracuse, N. Y.
 Sterling Emery Wheel Co., 174 Fulton st., New York City.
 Samson Cordage Works, Boston, Mass.
 Syracuse Twist Drill Co., Syracuse, N. Y.
 Schmidt, J. C. & Co., York, Pa.
 Schenectady Locomotive Works, Schenectady, N. Y.
 Straight Line Engine Co., Syracuse, N. Y.
 Standard Brush Co., 400 Broome st., New York City.
 Stilwell & Pierce Mfg. Co., Dayton, Ohio.
 Standard Rivet Co., 105 Summer st., Boston, Mass.
 Sercombe & Bolte Mfg. Co., 303 E. Water st., Milwaukee, Wis.
 Shannon, J. B. & Sons, 1020 Market st., Philadelphia, Pa.
 Sheffield Velocipede Car Works, Three Rivers, Mich.
 Swan Lamp Mfg. Co., Cleveland, Ohio.
 Schieren, C. A. & Co., 46 S. Canal st., Chicago.
 Stearns Mfg. Co., Erie, Pa.
 Sternbergh, J. H. & Son, Reading, Pa.
 Silver & Co., 56 Warren st., New York City.
 Slatery Mfg. Co., Springfield, Ill.
 Smith, H. B. Machine Co., Smithville, N. J.
 Schleicher, Schumm & Co., The Otto Gas Engine Works, 151 Monroe st., Chicago.
 Spalding, A. G. & Bros., 108 Madison st., Chicago.
 Springfield Emery Wheel Co., Bridgeport, Conn.
 Spring Curry Comb Co., South Bend, Ind.
 Schultz Gas Fixture & Art Metal Co., 1016 E. Baltimore st., Baltimore, Md.
 Steward & Romaine Mfg. Co., Limited, 123 N. Sixth st., Philadelphia, Pa.
 Seymour, H., Cutlery Co., Holyoke, Mass.
 Stover Bicycle Mfg. Co., Freeport, Ill.
 Shellenback Machine Tool Co., Richmond, Ind.
 Sellers, W. & Co., Philadelphia, Pa.
 Sterling Mfg. Co., Sterling, Ill.
 Sturtevant Mill Co., 88 Mason Building, Boston, Mass.
 Smith & Wesson, Springfield, Mass.
 Savage Arms Co., Ithaca, N. Y.
 Starrett, L. S., Athol, Mass.
 St. Louis Car Wheel Co., Commercial Bank Building, St. Louis.
 Syracuse Steel Foundry Co., Syracuse, N. Y.
 Sharon Steel Casting Co., Sharon, Pa.
 Standard Matrix-Making Machine Co., St. Louis, Mo.
 Standard Wagon Co., Cincinnati, Ohio.
 Stiles & Parker Press Co., 17 Adams st., Brooklyn.
 Standard Wheel Co., Indianapolis, Ind.
 Scaife, W. B. & Co., 119 First av., Pittsburgh, Pa.
 Supplee Hardware Co., 503 Market st., Philadelphia, Pa.
 Stow Mfg. Co., Binghamton, N. Y.
 Smith, G. L. & Co., 10 Bridge st., Newark, N. J.
 Storm Mfg. Co., Newark, N. J.
 Shipley, A. B., & Son, 503 Commerce st., Philadelphia, Pa.
 Schoen Mfg. Co., Pittsburgh, Pa.
 Schoen Pressed Steel Brake Beam Co., Pittsburgh.
 Smith, Theo. D. & Co., Plantsville, Conn.
 South Bend Pulley Co., South Bend, Ind.
 Snell Mfg. Co., Fiskdale, Mass.
 Sterling Co., Derby, Conn.
 Stewart Heater Co., Buffalo, N. Y.
 Stanley Works, New Britain, Conn.
 Stacy Mfg. Co., Dayton, Ohio.
 Solid Steel Co., Alliance, Ohio.
 Safety Emery Wheel Co., Bridgeport, Conn.
 Stafford Registering Bank Co., 66 Fulton st., New York City.
 Smith, E. P., Wire and Iron Works, 96 Lake st., Chicago.
 Sun Stamping Co., Kalamazoo, Mich.
 Steward, D. M., Mfg. Co., Chattanooga, Tenn.
 Schaeffer & Budenberg, Brooklyn, N. Y.
 Smith & Anthony Stove Co., Boston, Mass.
 Sykes Iron and Steel Roofing Co., 611 Morgan St., Chicago.
 Selle Gear Co., Akron, Ohio.
 Scott Spring Co., 1028 New Market st., Philadelphia, Pa.
 Sandwich Enterprise Co., Sandwich, Ill.
 Standard Steel Co., 230 So. Fourth st., Philadelphia, Pa.
 St. Louis Stamping Co., Cass av. and 22d st., St. Louis, Mo.
 Springer Torsion Balance Co., 92 Reade st., New York.
 Smith Machine Co., Smithville, N. J.
 Spicer Stove Co., Providence, R. I.
 Sperry, D. R. & Co., Batavia, Ill.
 Smith Friction & Tool Co., 88 Oliver st., Boston, Mass.
 Stover Mfg. Co., Freeport, Ill.
 Sneed & Co. Iron Works, Louisville, Ky.
 Star Drill Company, Rushville, Ind.
 Sheffield Velocipede Car Co., Three Rivers, Mich.
 Sellers, Morris & Co., 216 Phoenix Building, Chicago.
 Shelby Steel Tube Co., Shelby, Ohio.
 Simonds, Mfg. Co., Fitchburg, Mass.
 St. Joseph Pump Co., St. Joseph, Mo.
 Springfield Machine Co., Springfield, Ohio.
 Sherwood Mfg. Co., Buffalo, N. Y.
 Simons' Foundry, Cambridge, Ohio.
 Superior Stove Co., Superior, Mich.
 Skinner Chuck Co., New Britain, Conn.
 Steel Bath Clad Co., Detroit, Mich.
 Standard Water Tube Boiler Co., 151 Market st., Newark, N. J.
 Smith, C. R., Flaiting Co., Providence, R. I.
 Schulte, Lohoff & Co., Evansville, Ind.
 Southern Stove Works, Evansville, Ind.
 Summit Refrigerator Mfg. Co., Michigan City, Ind.
 Salem Lock Co., Salem, Ohio.
 Superior Furnace Co., Little Falls, N. Y.
 South Brooklyn Rust-Proof Co., Brooklyn, N. Y.
 Standard Lubricator Co., New York.
 Skinner Eng. Co., Erie, Pa.
 Spencer's Sons, J. S., Guilford, Conn.
 Simonds Rolling Machine Co., Fitchburg, Mass.
 Schleicher & Schumm, Thirty-third and Walnut sts., Philadelphia.
 Snow Steam Pump Works, Buffalo, N. Y.
 Shaw Electric Crane Co., Muskegon, Mich.
 Somerton Tin Plate Works, Third av. and Third st., Brooklyn.
 Scoville & Adams Co., 523 Broome st., New York.
 Shelby Cycle Mfg. Co., Shelby, Ohio.
 Sterling Steel Co., Pittsburgh, Pa.
 Star Drilling Machine Co., Akron, Ohio.
 Shoulder Tie Plate Co., Jersey City, N. J.
 Terre Haute Shovel & Tool Co., Terre Haute, Ind.
 Tubular Axle Co., Auburndale, Ohio.
 Taplin, Rice & Co., Akron, Ohio.
 Triumph Compound Engine Co., 217 W. Second st., Cincinnati.
 Thomson Electric Welding Co., Boston, Mass.
 Thomson-Houston Electric Co., Lynn, Mass.
 Tate & Co., Malden, Mass.
 Ticonderoga Machine Co., Ticonderoga, N. Y.
 Totten & Hogg Iron & Steel foundry, Pittsburgh, Pa.
 Teller, R. K., Unadilla, N. Y.
 Thomas Mfg. Co., Springfield, Ohio.
 Tyler Tube & Pipe Co., Washington, Pa.
 Tophill, the I. N., Mfg. Co., Cleveland, Ohio.
 Tubular Rivet Co., 55 Lincoln st., Boston, Mass.
 Taylor N. and G. Co., Philadelphia, Pa.
 Thompson, Mfg. Co., Elkhardt, Ind.
 Trojan Car Coupler Co., Troy, N. Y.
 Tuttle & Bailey Mfg. Co., 83 Beekman st., New York.
 Trenton Iron Co., Trenton, N. J.
 Terre Haute Roofing & Mfg. Co., Terre Haute, Ind.
 Turner Machine Co., 35 West Fourteenth st., New York.
 Terre Haute Car & Mfg. Co., Terre Haute, Ind.
 Tabor Mfg. Co., 113 Liberty st., New York.
 Turner, Day & Woolworth Mfg. Co., Louisville, Ky.
 Torrey, J. R., Razor Co., Worcester, Mass.
 Tuerk Hydraulic Power Co., 39 Dearborn st., Chicago.
 Tatum, S. C. Co., 264 Water st., Cincinnati, Ohio.
 Tallahassee Falls Mfg. Co., Montgomery, Ala.
 Thomson Hydraulic Co., 408 Temple Court, New York.
 Taylor Iron & Steel Co., High Bridge, N. J.
 Tower & Lyon, 95 Chambers st., New York.
 Ulrich Engine Co., Florence, Mass.
 United Indurated Co., 55 Wabash av., Chicago.
 United States Graphite Co., Saginaw, Mich.
 United States Metallic Packing Co., 435 North Broad st., Philadelphia, Pa.
 United States Windmill, Engine & Pump Co., Batavia, Ill.
 Universal Sad Iron Co., 352 Broadway, Milwaukee, Wis.
 United States Wire Mat Co., Decatur, Ill.
 Union Bridge Co., 1 Broadway, New York City.
 Union Metallic Cartridge Co., Bridgeport, Conn.
 Union Iron Works, San Francisco, Cal.
 Union Mfg. & Plating Co., 236 Carroll av., Chicago.
 Union Iron Works Co., Newark, Ohio.
 Union Windmill & Mfg. Co., Albion, Mich.
 United States Lath (Sheathing) Co., La Crosse, Wis.
 Universal (Radial) Drill Co., Cincinnati, Ohio.
 Utica, Pipe Foundry, Utica, N. Y.
 University Plow Co., Wooster, Ohio.
 Valley Pump Co., East Hampton, Mass.
 Verona Tool Works, Pittsburgh, Pa.
 Viaduct Mfg. Co., Baltimore, Md.
 Valley Machine Co., Saginaw, Mich.
 Valley Iron Works Mfg. Co., Appleton, Wis.
 Vermont Farm Machine Co., Bellows Falls, Vt.
 Van Dorn Iron Works Co., 157 English av., Cleveland, Ohio.
 Vollrath, The Jacob J. Mfg. Co., Sheboygan, Wis.
 Vehicle Spring & Mfg. Co., Cincinnati, Ohio.
 Victor Toe Calk Co., 22 Pitt st., Boston, Mass.
 Vanderman Plumbing & Heating Co., Williamantic, Conn.
 Van Wagoner & Williams Co., Cleveland, Ohio.
 Vanette Water Purifier Co., Tiffin, Ohio.
 Vaughn Machine Co., Salem, Mass.
 Vulcan Road Machine Co., Charlestown, Jefferson County, W. Va.
 Vulcan Brass Co., 948 Hamilton st., Cleveland, Ohio.
 Whitman & Barnes Mfg. Co., Akron, Ohio.
 Woods, S. A. Machine Co., 61 South Canal st., Chicago.
 Waterbury Clock Co., 114 Wabash av., Chicago.
 Western Indurated Fiber Co., Winona, Minn.
 Worthington, H. R., 95 Lake st., Chicago.
 Wallace, R. & Sons Mfg. Co., 104 State st., Chicago.
 Weir, The, Plow Co., Monmouth, Ill.
 Wood, W. Dewees Co., 111 Water st., Pittsburgh, Pa.
 Watertown Steam Engine Co., Watertown, N. Y.
 Washburn & Moen Mfg. Co., Worcester, Mass.
 Withington & Cooley Mfg. Co., Jackson, Mich.
 Witherbee Sherman & Co., Port Henry, N. Y.
 Willer Mfg. Co., Fourth and Cedar sts., Milwaukee, Wis.

THE WEEK.

Ward, E., Air Engine Co., 63 and 65 Murray st., N. Y.
 Woodbury, Merrill, Patten & Waterbury Air Engine Co., 8 Exchange pl., Boston, Mass.
 Wheelock Engine Co., Worcester, Mass.
 Western Rubber Belting Co., 205 Lake st., Chicago.
 Warder, Busbnell & Glessner Co., Adams and Jefferson sts., Chicago.
 Williams, J. H. & Co., 9 Richards st., Brooklyn, N. Y.
 Western Wheeler Scraper Co., Aurora, Ill.
 Winslow, S., Skate Mfg. Co., Worcester, Mass.
 Whitney, A. Sons, Philadelphia, Pa.
 Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.
 Weimer Machine Works Co., Lebanon, Pa.
 Wheeler Condenser Engineering Co., 92 Liberty st., New York City.
 Westinghouse, Church, Kerr & Co., Chicago.
 Westinghouse Machine Co., Pittsburgh, Pa.
 Warner & Swazey, Cleveland, Ohio.
 Wood, Walter A., M. & R. Machine Co., Hoosick Falls, N. Y.
 Wisconsin Refrigerating Co., Eau Claire, Wis.
 Williams, C. T., Wire Novelty Co., Newark, N. J.
 Warren Featherbone Whip Co., Three Oaks, Mich.
 Williamson Bros., Richmond and York sts., Philadelphia.
 Wheelock, J., Worcester, Mass.
 Wrought Iron Range Co., 1901 Washington av., St. Louis.
 Wemple Horseshoe Co., 293 A st., Boston, Mass.
 Weir Stove Co., Taunton, Mass.
 Wisconsin Lead & Zinc Co., Shullsburg, Wis.
 Westinghouse Co., Schenectady, N. Y.
 Wilcox Heat & Light Co., South Bend, Ind.
 Ward, H. A., 10 College av., Rochester, N. Y.
 Wilcox Water Heater Co., 709 Chamber of Commerce Building, Chicago.
 Webster, Warren & Co., s. e. corner Canal and Randall sts., Chicago.
 Wire Fence Supply Co., Indianapolis, Ind.
 Westinghouse Air Brake Co., Pittsburgh, Pa.
 Whitely, The W. N. Co., Springfield, Ohio.
 West, T. D., Cleveland, Ohio.
 Whitman Agricultural Co., St. Louis, Mo.
 Wirt & Knox Mfg. Co., Independence, Mo.
 White, The J. A. Co., Dover, N. H.
 Wells Machine Works, Fostoria, Ohio.
 Walker Mfg. Co., Cleveland, Ohio.
 Wapakoneta Wheel Co., Wapakoneta, Ohio.
 Western Wheel Works, 495 Wells st., Chicago.
 Walworth Mfg. Co., 24 Oliver st., Boston.
 Wegman & Co., Auburn, Mass.
 Wire Grip Fastening Co., 96 Lincoln st., Boston.
 Warwick Cycle Mfg. Co., Springfield, Mass.
 Woods, Sherwood & Co., Lowell, Mass.
 Whiton, D. E., Machine Co., New London, Conn.
 Winton Bicycle Co., Cleveland, Ohio.
 Wainwright Mfg. Co., 8 Oliver st., Boston, Mass.
 Wilcox & Howe Co., Birmingham, Conn.
 Watts Mining Car Wheel Co., Booneville, Ohio.
 Wallace & Co., New York.
 Western White Bronze Co., Des Moines, Iowa.
 Westcott Chuck Co., Oneida, N. Y.
 Whitney, A. R. & Co., 29 Broadway, New York City.
 Waterbury Watch Co., Waterbury, Conn.
 Wheeling Steel & Iron Co., Wheeling, W. Va.
 West Superior Iron & Steel Co., West Superior, Wis.
 Wyman & Gordon, Worcester, Mass.
 Wilch, E. N. Mfg. Co., Forestville, Conn.
 Whipple Harrow Co., Leadville, Col.
 Wood Automatic Turbine Water Wheel Co., Portland, Maine.
 Western Clock Mfg. Co., LaSalle, Ill.
 Watson & Stillman, 204 E. Forty-third st., New York City.
 Walbridge, J. H. & Co., 43 Leonard st., New York City.
 Water Circulating and Grate Co., 1028 Filbert st., Philadelphia, Pa.
 Wilson Snyder Mfg. Co., Pittsburgh.
 Wells Engineering Co., 91 Liberty st., New York City.
 Yale & Towne Mfg. Co., Stamford, Conn.
 York Mfg. Co., 42, Water st., Boston Mass.
 Yawman & Erbe, Rochester, N. Y.
 Youngstown Stamping Co., Youngstown, Ohio.
 Zucker & Levett Chemical Co., 40 Murray st., New York.

One of the most interesting exhibitions in connection with the recent Orientalist Congress in London is a collection of tools used by workmen in building the pyramids of Egypt. Among the exhibits are solid and tubular corundum tipped drills and straight and circular saws and chisels, described as "not a bit inferior to those now used."

The American representative in Hayti and San Domingo gives little encouragement to hope that the United States will be able to obtain a coaling station either at Mole St. Nicholas or Samana Bay for many years.

The Chief of the Bureau of Yards and Docks in his annual report urges the necessity for a dry dock on the New England coast, capable of receiving the largest battle ships.

The property of the Continental Fire Insurance Company on Broadway and Pine street in this city, comprising a little more than two city lots, was sold for \$104,000, which is equivalent to \$176.48 a square foot. Sixty-two years ago the same property was bought for \$2500.

The authorities in Philadelphia propose to extend the Spring Garden pumping station at a cost of \$1,000,000.

There will be no general movement in forwarding corn from primary markets for a month or so.

A uniform system of buoying navigable waters throughout the world engages the attention of the Lighthouse Board.

The syndicate of New York and Philadelphia capitalists who have been buying up street railways in different cities for some time past have purchased the Atlantic Avenue Railway in Brooklyn, for something like \$3,000,000, and report says that negotiations for other lines are in progress.

Warned by the recent loss of two large steel steamers and discouraged by the present low rates of freight, some of the big lake steamers are going into winter quarters at once, three weeks before the usual time. The Erie Canal will close December 5.

The French Government has resolved to prosecute the administrators of the Panama Canal. The statements on which this action has been based are that of a capital of 1,300,000,000 francs only 471,000,000 francs were used properly, the difference being absorbed chiefly by politicians and newspapers. M. de Lesseps will be spared the humiliation of a defense.

The *Marine Journal* says there is no doubt but that the greatest weakness in lake vessels is due to the large number and size of hatches and cargo ports that are cut for the purpose of dispatch in discharging and loading.

Rag importers are becoming uneasy under the restrictions imposed by sanitary regulations. In Boston the Board of Health declined to take action in their behalf.

While Americans are building larger guns the British Admiralty, on the contrary, are reducing the size, and, according to report, will hereafter build no guns weighing over 50 tons.

While a ship was loading with cotton at Galveston a few days ago one of the bales, bound with iron ties, struck the metallic frame of the hatch and a spark flew off into the fiber, which immediately kindled into a flame and caused serious damage.

A twin-screw wrecking steamer to be launched soon at Tottenville, Staten Island, is expected to make 12 knots an hour on 4 tons of coal a day. She is 125 feet long and draws only 5 feet when laden.

A dispatch sent from Buffalo to the Western papers a few days ago gave warning of a switchman's strike to come off next May, with the hope of crippling the

World's Fair business and thus forcing the railroads to concede their demands. Secretary Haimlerle of the Switchmen's Union was named as authority, but the story has provoked no explanation.

More than two-thirds of the imports of Mexico come from the United States. During the fiscal year ended June 30, 1889, the imports from this country were valued at \$20,000,000; those of England \$6,000,000, France \$5,000,000, and Germany nearly \$3,000,000.

It is to be noted that, while the exports of Canada for the first quarter of 1892-3 show an increase of \$5,777,063 over the figures of the same period of 1891-92, not less than \$3,940,137 of this is in farm products, made up of \$1,371,355 in animals and their produce and \$2,568,782 in products of the field.

A report made to the Philadelphia *Commercial Exchange* by the chief grain inspector, who has just returned from a Western tour, says that in some sections wheat on the farms is selling as low as 41 and 45 cents, and a rapid decline in shipments is looked for.

A New York firm are said to have contracted for the entire wood-pulp product of Scandinavia for the coming year. The first installment of 2500 tons has just arrived. Thus the cholera, by checking the importation of rags, is responsible for the more rapid destruction of the forests.

It was stated at the United States Treasury that there would be no difficulty about funds to meet the expenses of the Government for the remainder of the present fiscal year, but that means for raising additional revenue will have to be provided for the next fiscal year.

Jersey City people are endeavoring to compel the Erie Railroad to raise its tracks above the surface.

An English shipbuilder has received an order for three large steamers for an American firm in the cattle trade.

Proposed improvements to cost \$5,000,000 have been approved by the stockholders of the Illinois Central Railroad Company. A great passenger station is rapidly rising, at a cost of \$1,000,000. Eight tracks which will carry the World's Fair traffic as well as other business are being elevated for a distance of over 3 miles, and costly steel viaducts are being made to span the streets.

The returns issued by the French Board of Trade show that during October the imports decreased 13,389,000 francs and the exports decreased 26,948,000 francs as compared with those of the corresponding month last year.

It is said that Col. A. A. Pope will petition Congress to establish a Department of Roads, similar to the Agricultural Department, for the purpose of promoting a systematic betterment of the highways of the country.

Questions are asked about the prospects of the several great bridge projects which have been before the Legislature of New York and have been pressed on the attention of capitalists. The proposition is to cross the East and North rivers, and half a dozen routes have been marked out, and although a second bridge to Brooklyn before many years seems probable it cannot be said with any confidence that one of the schemes which have figured on paper has any substantial basis at the present time.

T. W. Robinson has resigned the management of the Bay View plant of the Illinois Steel Company to accept the position of general superintendent of the Colorado Fuel & Iron Company at Pueblo, Col.

The Iron Age

New York, Thursday, November 24, 1892.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
 CHAS. KIRCHHOFF, - - - EDITOR.
 GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
 RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.
 JOHN S. KING, - - - BUSINESS MANAGER.

A Check to Industrial Growth.

A well-balanced mind seeks immediately for alleviating circumstances upon the appearance of adversity. Complaints are recognized as wholly futile, and instead of murmuring against fate an effort is made to extract some comfort from the possibilities of the future. This reflection has forced itself upon us more and more the past two weeks in coming in contact with manufacturers. The result of the election was an unexpected blow to them, as the great majority have received all their business training and experience under protection and are, therefore, naturally inclined to regard it as an essential condition of manufacturing success in America. That the nation should, in the year of grace 1892, overwhelmingly disapprove of the policy, was regarded as highly improbable. But, with the first shock over and the hard fact realized, came the question: What benefit will we derive, if any? A very common answer is, that the expansion of domestic competition will be decidedly checked for some time to come, as the uncertainties of the future will deter the investment of fresh capital in the great manufacturing lines either in the erection of new plants or the enlargement of old ones. There will be a waiting period, in which everybody will be anxious to see what effect lower duties, when they come, will have on industries or manufacturing enterprises already established.

For years every domestic industry has been suffering from excessive competition. An occasional period of active demand has brought about some improvement in business, but it has not only been short lived, but it has also immediately caused further productive expansion, intensifying the competition. Combinations and trusts have been formed to enable manufacturers to control their trade and reap a profit on their investments, but in only a few instances have they been even moderately successful. Agreements have been made to restrict production, but they only resulted in the encouragement of outsiders to enter the business. Now, however, it is felt on all sides that a more serious problem must be solved by manufacturers than the worry of a mere financial depression, and the general public will wait to see whether the solution is satisfactory. Manufacturers themselves believe that iron and steel prices will not recede much below their present level, because, with few exceptions, they are lower than ever before in the history of the country, and so low that a moderate

duty will mark the difference between values here and abroad. If the manufacturers are able to live now they will be in much better shape a year or two hence, with the growth of new establishments checked and, at the same time, the normal increase in the business of the country going forward.

The World's Fair Exhibits.

Contrary to general expectation, there will be very few comprehensive exhibits by trades or industries at the World's Fair. Attempts have been made by enthusiastic individuals to interest their colleagues in joint exhibits to show the progress of an industry or the development which it has attained, but they have been unsuccessful except in the case of carriages, boots and shoes and perhaps two or three other lines. The opportunity for a very impressive exhibit was perceived to be a grand one by the progressive members of quite a number of trades, and they were encouraged by the officers of the exhibition to work up such displays, as it was seen that they would be much more effective exponents of our mechanical and artistic skill than individual exhibits. The rank and file, however, were either indifferent or hostile. In many cases, it is to be feared, the individual members of a trade were influenced by the belief that they would not receive the advertising to be gained by a separate exhibit. There is some truth in this, as all manufacturers do not turn out equally attractive goods, and the more showy articles would naturally be relied upon to constitute the conspicuous parts of a joint display.

So far as applications for space are concerned, there is no lack of them. The official list of American exhibitors which has just been published comprises between 9000 and 10,000 names of individuals and firms. From Chicago alone there will be enough exhibitors to fill one or two of the largest buildings, if they could be applied to that purpose. New York has as many applicants as Chicago. Other large manufacturing cities are very well represented, and hardly a small town can be found with any pretensions in the manufacturing line which does not furnish at least one exhibitor. In very few instances will these applicants receive even an approximation to the space for which they have applied. The capacity of the buildings has been so greatly exceeded that allotments will have to be ruthlessly cut down. Discrimination will be exercised by the managers of the exhibition, however, and care will be taken that really meritorious exhibits shall receive adequate room for their presentation. Those of our readers who must have the space for which they have applied and whose exhibits will be of special merit should hasten to acquaint the exhibition officials with the circumstances so that they will not suffer. From present appearances the individual who applied for 1000 square feet to exhibit, say, paving stones, will consider himself highly favored if he gets an allotment of 20. There are prominent industries deserving

of a conspicuous position among the exhibits of the nations which will not receive more than 20,000 square feet in the great Manufactures Building, on which space will be clustered the individual exhibits of a large number of concerns. They could have jointly made a fine display in this space, but now each of them can do so little separately that some of the most prominent may conclude to make no exhibits whatever.

A decided mistake was evidently made by the management in announcing that no charge would be made for space. They probably were under the impression that there might be too few exhibitors rather than too many, and that a charge for space would deter numbers of persons capable of furnishing interesting exhibits from making application. But they have brought on themselves a totally different set of troubles. They are suffering from an embarrassment of riches in the way of exhibits. A reasonable rental for space would very probably have reduced the number of applicants, who would then have begun to count the cost of making an exhibit and decided that as an advertisement of their business they could not afford it. Joint displays would then have been presented as a cheaper and better way of making an exhibit and would have received vastly more favor. The revenue derived from the rental of space would also have been a very considerable item to the managers of the exhibition. Perhaps the officers of the next World's Fair will profit by this bit of experience and make exhibitors of merchandise pay something for the privilege of displaying their products in a bazaar of all nations.

The Copper Situation.

The figures relating to production which were published in *The Iron Age* last week possess a good deal of interest, since they show that the market is not being overloaded with the metal. Since July 1 the product of the United States, for four months, has been 97,565,440 pounds, against an expected total of about 105,000,000. In other words, the mining companies either cannot or will not work at the rate which they expected to reach when the association was formed ere the gentlemen's agreement was entered into. The mining companies are very earnest and emphatic in their protestations that they are not working under any combination whatever. They assert that there is no agreement to keep production within certain limits, and no attempt is being made to fix prices. We are told that the only thing which the united or associated or friendly producers do is to tell one another, monthly, how much copper they have produced and discuss at irregular intervals the weal and woe of the trade.

The effect of this interchange of information and comment is said to be excellent. It is particularly useful in nipping in the bud the falsehoods and exaggerations concerning the other sellers' business which wicked buyers and newspaper men

pour into the unwilling ears of every prominent copper miner.

The organization of the European producers controlling the leading mines on the Continent, in Mexico, Venezuela, the Cape and Australia, seems to be less shadowy. Their production for the first four months of the second half of this year is placed at 56,448,000 pounds, which is 7,051,520 pounds below the estimates which the constituent companies put in their product for such a period.

Of course the principal argument for an advance has been the stoppage of the Anaconda Company, which has been running at the rate of 6,000,000 to 7,000,000 pounds per month, although its capacity, and at one time its actual product, was over 12,000,000 pounds per month. It is not expected that the shipments of copper will immediately cease, because there must be a good deal of ore and intermediate furnace material in stock and in process of conversion into shipping matte and electrolytic copper. Still, the fact remains that the product is to be cut down for some months by at least 6,000,000 pounds a month, which with a fairly good demand, means all the difference between a pressing surplus and a considerable inroad into stocks. The resumption of work at the great Montana mine will, however, always hang above the market as a very serious threat to the maintenance of prices. Few consumers will take the risk of making long time contracts under the circumstances.

Cotton Prospects.

The advance in the price of cotton during the fall has attracted the attention of the entire industrial community to the improved financial condition which it is promoting in the Southern States. Owing to an almost unprecedentedly large crop during 1891, prices fell off to a point which wiped out the margin of profit and stimulated the retention of stocks among planters. As a result the railroads were compelled to accept lower freight tariffs, while the general cutting of rates which followed became so aggravated that the various lines found themselves deprived of the income on which they depended yearly to pay their interest. The railroads also suffered because of the general business depression which followed.

In conformity to the laws of supply and demand, economic conditions were adjusted the year following and 15 per cent. less acreage was sowed. Had the present crop been as excellent a one as that of 1891 it would have been less by 15 per cent. Returns are now more or less complete and show that the crop has been seriously damaged by frosts, damp weather, overflows, &c. It is conservatively estimated at 6,500,000 bales, against 9,088,000 bales during 1891. This naturally stimulated buying, and this in turn advanced prices and promoted a greater activity on the various cotton exchanges than was ever known. As is usual in the case of an advance, a large speculative element became assertive and a heavy short in-

terest was created on the expectation that the market would be top-heavy and prices would decline. However, up to the present time the effect has been directly opposite to that anticipated, and the short interest has been badly squeezed. The advance has been aided by the prospects of a settlement of the Manchester, England, cotton strike, which involves 60,000,000 spindles and which is a protest against the 5 per cent. wage reduction.

In November, 1891, the price of cotton was 7.80 cents. The current price is 9.15 cents. On a 500-pound bale this is a difference of \$6.75. Even assuming that the 1891 crop was marketed with little or no profit, the \$6.75 additional per bale received this year represents a profit of \$43,875,000. The 15 per cent. decrease in average and the consequent decrease in production is offset by the revenue derived from other crops raised. Moreover, the land has been benefited by this rotation of crops.

The present crop is in some cases 30 days late. This has also steadied the market by keeping it free of excessive stocks. The total receipts of cotton last week at the commercial centers of the country were 262,766 bales, and the receipts since September 1, 2,241,457 bales, against 325,714 bales and 3,159,461 bales respectively during the corresponding periods of 1891. From these figures it will be seen that there is a marked falling off in the movement, which is due to the causes previously stated. From the general industrial and trade standpoint the short crop is going to be of immense benefit to the South, as it has already created an active market at higher prices.

A word concerning the railroads. The degree of financial prosperity of the various railroad systems of the country reflects the country's financial status. Nearly one-half the railroad mileage of the South is in the hands of receivers. This fact is most eloquent in portraying the situation. Equally suggestive is the hopefulness displayed by the different systems. The Southern Railway and Steamship Association, which embraces all lines south of the Potomac and east of the Mississippi, held a prolonged session at the Fifth Avenue Hotel in this city last week. It was developed that a most ruinous cutting and slashing of rates had been the practice for over a year. It was claimed that the general business depression was the cause. The conclusion reached was that the South is in shape to contribute its quota to the railroads. It was decided at this meeting to adhere strictly to published tariffs.

The South, in times of prosperity, because of the agricultural nature of its industries, is one of the best markets to which the manufacturing interests of the balance of the country have access. Every indication is that the South will be in a position to pay its debts and become a heavy buyer during the next 12 months.

Natural gas is now being supplied to the residents of a large part of Chicago, the arrangement having at last been com-

pleted the past week. It is taken from the Kokomo field in Indiana, about 125 miles distant, the natural pressure being supplemented by pumps located along the pipe line. The supply is not large enough to make the gas available for manufacturing purposes, the company restricting their operations to domestic consumers. In time other pipes may be laid for the use of manufacturers. The conveyance of natural gas from Indiana to Chicago seemed a chimerical project, and for a long time there was much skepticism over the outcome. The scheme is now an assured fact, however, and the use of natural gas in Chicago will from this time depend solely on the permanence of the supply in the Indiana gas belt.

The final complete collapse of the Homestead strike will be regarded by iron manufacturers generally as a victory over the Amalgamated Association which deeply concerns them all. As matters stand now it will take an extraordinary coincidence of favorable circumstances to cause prompt submission to the dictates of the Amalgamated Association. The markets are not likely to starve for material whenever the men see fit to stop work. But probably the majority of makers of iron and steel, and a good many consumers, have received the announcement of full resumption at Homestead with quite different thoughts uppermost in their minds. They expect the early appearance in the market of an exceedingly lively competitor who has the reputation that he does not hesitate to go close to cost when it is necessary to fill the order book. It is true that Homestead has been running after a fashion for months, but it was only lately that the open markets felt indications of it. Now it will soon tell.

The Homestead Strike Broken.

During last week important developments affecting the long-drawn-out struggle between the locked-out men at Homestead and the Carnegie Steel Company, Limited, over the refusal of that firm to recognize the Amalgamated Association took place. Early in the week it was evident that the strikers had come to the conclusion that the strike was hopelessly lost, and in order to get the sentiment of the locked-out men as to whether the strike would be declared off and the men return to work, a meeting of the officials of the Amalgamated Association was held at Homestead. What took place at this meeting was not divulged; but the fact that the mechanics and laborers were denied admittance to the meeting caused considerable unfavorable comment in their ranks. Rumors were going that the strike would be declared off, and on Wednesday morning about 150 Slavs and Hungarians made application for their old positions in the plant. The majority of these men were taken back, but a few who had made themselves particularly obnoxious to the firm were told that they could not have employment under any circumstances. On the day following, Thursday, about 300 more laborers who had been out on strike in order to show their sympathy with the locked-out men made application for their old positions, and with very few exceptions were all

given employment. With the return of these men to work, the question came up whether the men employed in the mechanical department would still stay out in sympathy with the Amalgamated Association men, or would follow the example of the laborers and return to work. All doubts as to the course they would pursue were set at rest on Friday, when after a meeting lasting several hours it was unanimously decided to return to work. Immediately following the meeting a wild scramble was made for General Superintendent C. M. Schwab's office, and the men were admitted in squads of five and ten and after being given passes were told to make application to the different superintendents for their old positions.

It will be remembered that in the scale of wages prepared by the Carnegie Steel Company, Limited, to go into force July 1 last, the wages of laborers and men employed in the mechanical departments were not reduced, but in some cases were advanced. In addition to this these men had, through representatives, signed a scale governing their wages until December 31, 1893, agreeing to return to work as soon as they were wanted. Notwithstanding this, however, they were induced by the skilled workmen belonging to the Amalgamated Association to go out on strike in order to lend their aid with the skilled workmen to compel the Carnegie Steel Company, Limited, to recognize the Amalgamated Association. Reports are going that promises made by the Amalgamated Association to pay weekly benefits to the laborers and mechanical force have been totally disregarded, many of the men not having received a dollar during the entire time they were idle.

The action of the men in returning to work at Homestead will no doubt have considerable influence upon the men who are still out on strike at the Upper and Lower Union Mills of the firm in Pittsburgh. While it is true, as has been stated in these columns before, that both these plants are being operated to their full capacity, it is also true that some of the old workmen would be given positions should they make application for them, as the men employed at the Upper and Lower Union Mills went out on strike merely to show their sympathy. It is very likely that the strike at these two mills will be declared off during this week by the Amalgamated Association, which will permit any of the locked-out men who can procure positions to return to work and still retain their membership in that organization.

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New Castle, Pa., to work in the Bessemer plant of the Shenango Valley Steel Company, at that place, have also sent in applications for positions, thus forfeiting their membership in the Amalgamated Association.

Of all the conflicts between Pittsburgh manufacturers and the Amalgamated Association during this year not a single victory can be credited to the side of that organization.

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Yours faithfully,

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WIGAN, November 10, 1892.

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Our readers may recall the fact that last January a boiler explosion occurred in one of the buildings in Chicago owned by Warren Springer, which resulted in the death of five persons. Mr. Springer had been particularly enterprising in the erection of buildings to be used for manufacturing purposes, furnishing power to the various tenants. His buildings are perhaps the largest and finest in the country that have been built to meet the requirements of manufacturers who desire limited space and power, and his operations in this direction have given him great prominence in the business world. The boiler explosion referred to was alleged to have been caused by his negligence in not keeping one of his boiler plants in proper repair, and in due time he was indicted for manslaughter. The trial took place in Judge McConnell's Court last week, and a great deal of evidence was submitted from boiler experts. On Friday the judge concluded that the testimony given in behalf of the State was not sufficient to prove criminal negligence on the part of Mr. Springer, and then gave the jury the following instruction:

It is barely possible, gentlemen of the jury, that there may have been some little lack of care on the part of somebody in that establishment, but it is impossible from the testimony we have received in this case to determine whose it was, and it is impossible to fix the responsibility on Mr. Springer; that is, in such a direct way for so serious an offense as manslaughter. We have here at least three different theories as to how this explosion happened. If I should send the jury out upon this evidence you would have to speculate as to which one of the theories accounted for the accident. Even if you should determine which one you would accept you would still have to determine that the defendant in this case was responsible for criminal negligence. Negligence as far as you can hold a man criminally is of a different order from that for which you would hold a man in a civil action. Here it must be an absolute cause, an immediate cause, before you can hold a man responsible. So it would simply be wasting your time. I would be putting upon you a responsibility that I am willing myself to assume. I therefore advise the jury to return a verdict of not guilty.

The verdict was rendered in accordance with the charge of the judge, and Mr. Springer was thereupon acquitted.

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J. F. Holloway, vice-president and treasurer of Henry R. Worthington, has appraised the plant, real estate and stock on hand at \$1,925,000, included in which is raw material on hand, manufactured goods and goods in process of manufacture valued at \$760,000. In addition thereto the vendor's claim a net balance of open book accounts, bills receivable and cash of \$209,000, making the total assets \$2,134,000. Mr. Holloway, speaking of the plant and the business, says:

"My examination of the plant as a whole leads me to believe that its efficiency for

the purpose for which it is being used was never greater than at present. By the erection of new buildings and the introduction of new tools, its capacity has not only been increased, but its processes for manufacturing have been improved as well. The tools generally are in excellent condition, many being new, and with few exceptions all of modern construction and well adapted to the purposes for which they are being used. For tools as well cared for as are these, the changes for current depreciation cannot but be comparatively light.

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Deloitte, Dever, Griffiths & Co., accountants, report:

"We have examined your accounts for a period of three years from January 1, 1889, to December 31, 1891, and we find the following to be the profits before charging interest on capital employed, the remuneration of officers and depreciation of buildings, plant, machinery, tools, fixtures, patents, pattern, &c.:

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"In arriving at these profits, we have reversed amounts written off the value of the assets and patents, which we are informed are not actual losses, including two sums of \$50,000 and \$20,000, which latter amounts were deducted from the inventories at the end of 1890 and 1891 respectively. We have been assured that these sums were taken in reduction of the value for the purpose of providing a fund for equalization of profits."

The officers confirm the above and state that these amounts were arbitrarily charged to keep down immediate dividends and increase surplus. By the balance sheet of Messrs. Deloitte, Dever, Griffiths & Co., the total amount of such surplus, *i. e.*, accrued profits, contributed to increase of plant up to January 1 last, was \$1,099,187.47.

The prospectus states that T. A. Pratt, Amos Whitney, Hon. Henry C. Robinson, Rowland Swift and John R. Redfield, of Hartford, have consented to serve as directors of the new company.

The Stilwell-Bierce & Smith-Vaile Company.

A company has been formed under the laws of New Jersey to acquire the property of the Stilwell & Bierce Mfg. Company and the Smith & Vaile Company, both situated at Dayton, Ohio. The capital stock consists of 5,000 shares of common stock, \$100, par, and 5000 shares of 8 per cent. cumulative preferred stock, the former being taken by the vendors, while the latter is offered for public subscription at par by Henry Clews & Co., New York; W. E. Hutton & Co., Cincinnati; the Third National Bank, Dayton, and the Winters National Bank, Dayton, Ohio. The Stilwell & Bierce Company are makers of the Victor turbine, while the Smith & Vaile Company, established in 1874, make a specialty of pumping machinery, hydraulic machinery and presses, and cotton and linseed oil machinery. Barrow, Wade, Guthrie & Co., accountants, certified that they have found

by examination of the books of the two concerns that for the three years ending December 31 the net profits, after charging all trading expenses, bad debts, managers' salaries, and providing liberally for replacement and depreciation of machinery and tools, amounted to \$283,973.19, equal to an annual profit of \$94,657.73. The assets of the two companies were as follows on December 31, 1891:

Inventory of stock and materials on hand.....	\$306,919.26
Bills receivable, book accounts, cash.....	311,873.40
Real estate, buildings, machinery and appliances (appraisers' certificate).....	407,979.89
Additional cash capital (contributed).....	50,000.00
Total.....	\$1,076,772.55
Less bills and accounts payable..	168,131.66
Net assets.....	\$908,640.89

The accountants say that the above amount, plus the profits for the current year, less dividends declared amounting to \$77,000, will represent the total net assets transferred to the new company, exclusive of patent rights and good will.

Mahoning and Shenango Valley.

All the rolling mills in the valleys are running full time and report sufficient orders to keep in operation until after the opening of the new year, though prices still remain low with little indication of an advance.

The Union Iron & Steel Company have ordered for their Warren plant three new gas producers to supply the new furnaces recently built in that mill. They are also making several improvements at their Girard plant in the 10-inch department.

The Tod Furnace at Brier Hill, operated by the Youngstown Steel Company, was put in blast last Saturday after several weeks' shut down. A new lining and bosh has been put in and several improvements made at their Washed Metal plant during the stoppage. This company propose to make low phosphorus blooms, billets and muck bar. They also expect to make a higher class of material than is now in the market to be used largely by crucible steel makers. About \$30,000 is being expended in these improvements. Their new engine house and machine shop is one of the largest and most complete in this part of the country and the two new Porter-Hamilton engines which Wm. Tod & Co. are building for them will make the finest outfit of any in this section. The capacity of the furnace is 180 to 200 tons per day.

The Youngstown Stamping Company are running their plant in full and report large orders for oil cans and house tinware. This is the largest stamping works in Eastern Ohio.

Work is progressing rapidly on the new stoves for the Hubbard furnaces operated by the Andrews & Hitchcock Iron Company. It is expected they will be ready for service in January next.

The Hubbard Machine Company, employing 40 to 50 men, is contemplating removal from Hubbard to some more favorable point, and at present has the town of Marion, Ind., in view.

P. L. Kimberly & Co. are erecting a new shearing department at their Greenville mill, and several new porcupine boilers are to be put in the furnaces of the finishing departments. Steel has almost superseded iron in this mill. The situation is not promising to the puddlers.

The Cherry Valley Iron Company of Leetonia have started their new pin and link mill and are making nearly 20 tons of pins a day and the same amount of links.

OBITUARY.

JOHN J. BERTSCH.

The many friends in the trade of John J. Bertsch, junior member of the firm of Bertsch & Co., were pained to hear of his death, which occurred on October 27 after a brief illness. He was taken sick several weeks since, but his energy and strong will power enabled him to look after his business until within two weeks of his death, when he was confined to his room, even then little thinking that his condition was serious. Mr. Bertsch was a native of Butler County, Ohio, and was born some 42 years ago. Upon leaving the farm upon which for many years he was engaged with his father, he went to Cambridge City, Ind., and formed a partnership with his brother Charles for carrying on the business of butchering. This continued several years, and when the agricultural and machine works were inaugurated in the city named, the two brothers became stockholders. Afterward they purchased the plant, and, securing patents on metal rolls and shears, they built up a large business. Mr. Bertsch had charge of and managed the financial and office matters, while his brother Charles was general manager of the mechanical portion of the works. The business will be continued under the firm name of Bertsch & Co. as heretofore.

JOHN M. WARD.

John M. Ward, of the Chicago *Journal of Commerce*, died in that city on the 14th inst., aged 74 years. Two weeks before he had been stricken with paralysis, from the effects of which he never recovered. Mr. Ward was an old resident of Chicago, and was secretary and treasurer of the *Journal of Commerce* Company for 29 years. He was a native of Canada and went to Chicago when a young man. Mr. Ward became connected with the *Journal of Commerce* soon after it was founded in 1861, and was actively identified with its management up to the time of his death. When the big fire in 1871 destroyed everything that the *Journal of Commerce* possessed except its book accounts, Mr. Ward made no appeal for time or credit, but stated to its creditors that the bills due from outside firms would more than repay all indebtedness. His statement was satisfactory to his creditors, and on this assurance alone paper manufacturers, typefounders and press builders furnished him with the necessary equipment to resume business. Their trust in his integrity was not misplaced. The remains were taken to Belleville, Ont., his old home, for interment. Mr. Ward left a widow, two daughters and a son, Robert Ward, receiving teller of the Merchants' Loan and Trust Company's Bank.

HENRY W. GETMAN.

The death of Henry W. Getman at Columbian Springs has been received with much regret at his native place, Ilion, N. Y. He was formerly a proprietor of the Novelty Works at Ilion and owned several patents manufactured by them. Failing health compelled him to retire. He was a Mason and a member of the A. O. U. W. He leaves his widow, a son and a daughter.

The Brazilian seat of Government will be transferred from the city of Rio Janerio, with its splendid harbor, to the city of Goyaz, in the province of the same name, far in the interior of the immense South American republic. The new Brazilian constitution provides for the change, and the preliminary work has now been begun. Goyaz is a town with 10,000 or 12,000 inhabitants, located on the auriferous Vermelho River, an affluent of the Araguay, one of the tributaries of the Amazon.

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The prospectus states that T. A. Pratt, Amos Whitney, Hon. Henry C. Robinson, Rowland Swift and John R. Redfield, of Hartford, have consented to serve as directors of the new company.

The Stilwell-Bierce & Smith-Vaile Company.

A company has been formed under the laws of New Jersey to acquire the property of the Stilwell & Bierce Mfg. Company and the Smith & Vaile Company, both situated at Dayton, Ohio. The capital stock consists of 5,000 shares of common stock, \$100, par, and 5000 shares of 8 per cent. cumulative preferred stock, the former being taken by the vendors, while the latter is offered for public subscription at par by Henry Clews & Co., New York; W. E. Hutton & Co., Cincinnati; the Third National Bank, Dayton, and the Winters National Bank, Dayton, Ohio. The Stilwell & Bierce Company are makers of the Victor turbine, while the Smith & Vaile Company, established in 1874, make a specialty of pumping machinery, hydraulic machinery and presses, and cotton and linseed oil machinery. Barrow, Wade, Guthrie & Co., accountants, certified that they have found

by examination of the books of the two concerns that for the three years ending December 31 the net profits, after charging all trading expenses, bad debts, managers' salaries, and providing liberally for replacement and depreciation of machinery and tools, amounted to \$283,973.19, equal to an annual profit of \$94,657.73. The assets of the two companies were as follows on December 31, 1891:

Inventory of stock and materials on hand.....	\$306,919.26
Bills receivable, book accounts, cash.....	311,873.40
Real estate, buildings, machinery and appliances (appraisers' certificate).....	407,979.89
Additional cash capital (contributed).....	50,000.00

Total.....	\$1,076,772.55
Less bills and accounts payable..	168,131.66

Net assets..... \$908,640.89

The accountants say that the above amount, plus the profits for the current year, less dividends declared amounting to \$77,000, will represent the total net assets transferred to the new company, exclusive of patent rights and good will.

Mahoning and Shenango Valley.

All the rolling mills in the valleys are running full time and report sufficient orders to keep in operation until after the opening of the new year, though prices still remain low with little indication of an advance.

The Union Iron & Steel Company have ordered for their Warren plant three new gas producers to supply the new furnaces recently built in that mill. They are also making several improvements at their Girard plant in the 10-inch department.

The Tod Furnace at Brier Hill, operated by the Youngstown Steel Company, was put in blast last Saturday after several weeks' shut down. A new lining and bosh has been put in and several improvements made at their Washed Metal plant during the stoppage. This company propose to make low phosphorus blooms, billets and muck bar. They also expect to make a higher class of material than is now in the market to be used largely by crucible steel makers. About \$30,000 is being expended in these improvements. Their new engine house and machine shop is one of the largest and most complete in this part of the country and the two new Porter-Hamilton engines which Wm. Tod & Co. are building for them will make the finest outfit of any in this section. The capacity of the furnace is 180 to 200 tons per day.

The Youngstown Stamping Company are running their plant in full and report large orders for oil cans and house tinware. This is the largest stamping works in Eastern Ohio.

Work is progressing rapidly on the new stoves for the Hubbard furnaces operated by the Andrews & Hitchcock Iron Company. It is expected they will be ready for service in January next.

The Hubbard Machine Company, employing 40 to 50 men, is contemplating removal from Hubbard to some more favorable point, and at present has the town of Marion, Ind., in view.

P. L. Kimberly & Co. are erecting a new shearing department at their Greenville mill, and several new porcupine boilers are to be put in the furnaces of the finishing departments. Steel has almost superseded iron in this mill. The situation is not promising to the puddlers.

The Cherry Valley Iron Company of Leetonia have started their new pin and link mill and are making nearly 20 tons of pins a day and the same amount of links.

OBITUARY.

JOHN J. BERTSCH.

The many friends in the trade of John J. Bertsch, junior member of the firm of Bertsch & Co., were pained to hear of his death, which occurred on October 27 after a brief illness. He was taken sick several weeks since, but his energy and strong will power enabled him to look after his business until within two weeks of his death, when he was confined to his room, even then little thinking that his condition was serious. Mr. Bertsch was a native of Butler County, Ohio, and was born some 42 years ago. Upon leaving the farm upon which for many years he was engaged with his father, he went to Cambridge City, Ind., and formed a partnership with his brother Charles for carrying on the business of butchering. This continued several years, and when the agricultural and machine works were inaugurated in the city named, the two brothers became stockholders. Afterward they purchased the plant, and, securing patents on metal rolls and shears, they built up a large business. Mr. Bertsch had charge of and managed the financial and office matters, while his brother Charles was general manager of the mechanical portion of the works. The business will be continued under the firm name of Bertsch & Co. as heretofore.

JOHN M. WARD.

John M. Ward, of the Chicago *Journal of Commerce*, died in that city on the 14th inst., aged 74 years. Two weeks before he had been stricken with paralysis, from the effects of which he never recovered. Mr. Ward was an old resident of Chicago, and was secretary and treasurer of the *Journal of Commerce* Company for 29 years. He was a native of Canada and went to Chicago when a young man. Mr. Ward became connected with the *Journal of Commerce* soon after it was founded in 1861, and was actively identified with its management up to the time of his death. When the big fire in 1871 destroyed everything that the *Journal of Commerce* possessed except its book accounts, Mr. Ward made no appeal for time or credit, but stated to its creditors that the bills due from outside firms would more than repay all indebtedness. His statement was satisfactory to his creditors, and on this assurance alone paper manufacturers, typefounders and press builders furnished him with the necessary equipment to resume business. Their trust in his integrity was not misplaced. The remains were taken to Belleville, Ont., his old home, for interment. Mr. Ward left a widow, two daughters and a son, Robert Ward, receiving teller of the Merchants' Loan and Trust Company's Bank.

HENRY W. GETMAN.

The death of Henry W. Getman at Columbian Springs has been received with much regret at his native place, Ilion, N. Y. He was formerly a proprietor of the Novelty Works at Ilion and owned several patents manufactured by them. Failing health compelled him to retire. He was a Mason and a member of the A. O. U. W. He leaves his widow, a son and a daughter.

The Brazilian seat of Government will be transferred from the city of Rio Janerio, with its splendid harbor, to the city of Goyaz, in the province of the same name, far in the interior of the immense South American republic. The new Brazilian constitution provides for the change, and the preliminary work has now been begun. Goyaz is a town with 10,000 or 12,000 inhabitants, located on the auriferous Vermelho River, an affluent of the Araguay, one of the tributaries of the Amazon.

MANUFACTURING.

Iron and Steel.

Best, Fox & Co., brass founders and machinists, of Pittsburgh, have just received an order for a set of Gayley's bronze cooling plates, to be furnished to the Pennsylvania Steel Company, at Sparrow's Point, Md.; also one set to be furnished to the Edgar Thomson Steel Works, at Bessemer, Pa. This firm recently shipped an order of 30,000 pounds of ingot bronze to the Chicago, Burlington & Quincy Railroad, and have received an order for a large amount of ingot bronze to be shipped to Glasgow, Scotland.

The Superior Steel Company, recently organized at Pittsburgh, and which concern are building a plant for cold rolling at Mansfield, Pa., have also decided to erect a hot mill to roll down from billets. The new mill will be a 14-inch, made by the Scaife Foundry & Machine Company of Pittsburgh, and will be driven by a 28 x 36 inch high-speed engine, furnished by Jas. Rees, also of Pittsburgh. The firm expect to have their cold-roll mill in operation before the first of the year and the hot mill in the early part of the year.

The foundations for the new Bessemer plant now under erection by the National Tube Works Company, at McKeesport, Pa., have been completed, and work on the superstructure has been commenced. It will be remembered that the contract for the erection of this plant was secured by the Pittsburgh Iron & Steel Engineering Company of Pittsburgh.

Capt. F. H. Conner, general manager of the Georgia Mining & Mfg. Company, states that extensive repairs were commenced last week on their furnace at Rising Fawn, Ga. It will take two months to complete the work, when the furnace will resume operations.

A general creditors bill was filed in Chancery Court last week against the Dunlap Coal, Iron & Railway Company of Dunlap, Tenn., asking for the appointment of a receiver. The affairs of the company are in a bad condition and crookedness is charged by some of the stockholders.

Upon the application of attorneys representing the non-resident creditors, the bondholders of the Rome, Ga., Rolling Mill Company, as well as the employees of the mill, D. B. Hamilton, Jr., has been appointed receiver of the Rome Cotton Tie Company.

It is stated that the purchasers of the Fort Payne (Ala.) Rolling Mill, Messrs. J. A. Wilder, Chas. Turner and J. K. Lanning, will put the plant in operation at an early day. They have incorporated the Alabama Steel Works with a capital of \$225,000.

P. D. Langdon, of the Langdon Iron Works, Langdon City, Ala., states that he is laying in stock and making preparations to put his furnace in blast December 15.

The Gadsden (Ala.) Furnace Company's plant has been advertised at a special master's sale November 28, inst., to satisfy a claim held by the East Tennessee, Virginia & Georgia Railroad. This furnace was built in 1887-88, and blown in October 14, 1888. It is 75 x 15, closed top, and has three Whitwell stoves.

A motion for the appointment of a receiver for the Ohio Brass & Iron Mfg. Company has been filed at Cleveland, Ohio. It is claimed that the company is insolvent.

It is stated that the remodeled Raney & Berger Furnace, at New Castle, Pa., will be ready for blast in a short time.

The Pine Mountain Iron & Coal Company of Louisville, Ky., have decided to go into liquidation. The assets consist of notes, real estate at Pineville, Ky., and real estate at Minneapolis, amounting in the aggregate to \$400,000.

The Stewart wire plant in South Easton, Pa., which recently passed into the hands of the reorganized Stewart Wire Company, will this week start up on double shift. A large building, idle for many years, has been taken by the company and made a part of its plant. The South Easton Wire Nail Company have been chartered under the laws of New Jersey and will operate in conjunction with this plant.

The annual meeting of the Oriskany Malleable Iron Works' directors was held at Oriskany, N. Y., November 14, and a dividend of 7 per cent. was declared. The company have transacted a paying business during the past year, and 112 men are now employed at the works. The directors elected are: George Graham, William P. Locke, George H. Graham, A. Baer, Samuel Nelson; inspectors of elections, William H. Sink, Charles L. Easton and Adelbert Pratt. The directors organized by electing the following: President, George Graham; vice-president, William P.

Locke; secretary and treasurer, George H. Graham; executive committee, George H. Graham, George A. Baer and Samuel Nelson.

Machinery.

The Chase Machine Company, of Cleveland, Ohio, have just completed an order for two large punching machines, each weighing 7000 pounds, and a condenser pump 12, and 15 x 15 inches, for the Detroit Electric Light and Power Company of Detroit, Mich.

Work has commenced on a large extension to the Connelly Gas Engine Works, at New Castle, Pa.

The Lobdell Car Wheel Company of Wilmington, Del., will erect a new machine shop, 150 x 79 feet in size, two stories high.

The Diamond State Car Spring Company of Wilmington, Del., are building an addition to its foundry.

The Tacony Iron & Metal Company, Tacony, Philadelphia, have placed an order with the Niles Tool Works for a lathe of unusual dimensions—48-inch swing and 30 feet between centers—which is intended for operating the very large castings, such as iron pillars, girders, &c., which are now being turned out from the company's works.

A large order for hydraulic projectile drawing presses has been awarded to Watson & Stillman of New York by the United States Projectile Company of Brooklyn. Orders for hydraulic presses, pumps and accumulators have been so abundant during the past year that it has been found necessary to operate their plant both day and night, notwithstanding increased facilities in the several departments.

The Tyler Tube & Pipe Company of Washington, Pa., manufacturers of boiler tubes and charcoal iron blooms, who are building a new machine shop in connection with their plant, have contracted with the Gleason Tool Company of Rochester, N. Y., for one of their 38-inch swing special lathes.

Asa Goddard of Worcester, Mass., manufacturer of blacksmiths' upright drills, expects to move into new quarters about December 1. The increased room and better facilities will enable him to fill orders more promptly than has been possible heretofore.

L. Schutte & Co., machinists and engineers of Philadelphia, are making extensive alterations and improvements in their factory at the corner of Twelfth and Thompson streets, in that city. The firm have purchased the property adjoining their former premises in order to provide the additional room which is rendered imperatively necessary by increase of business. Both houses have been torn down by degrees and are now being replaced by a single building, which will afford sufficient room to double the former facilities of the establishment. The new building when complete will be an exceedingly handsome and striking piece of architecture. Exteriorly it will probably rival for ornateness any manufacturing establishment in this country, while the internal arrangements are of the most modern and efficient character. The building covers a space 81 x 84 feet, rising to a height of five stories, while a tower 20 feet square contains two additional stories. The basement, which has a cement floor, is occupied by the brass foundry, boiler rooms, &c., while the lower floor contains the heavy machinery, being brick arched, with iron girders. The second story is given up to offices, &c., and the upper ones are to be machine and pattern shops. A cement-paved testing room is placed on each floor, as well as lavatories and dressing rooms of the most complete and convenient kind, each workman having his own closet. The windows are out of the ordinary factory pattern, but are fitted with large sashes of strong plate glass, which admit a maximum of light. A fire escape, which is reached by ornamental wrought-iron balconies from each floor, is situated in the brick tower before mentioned. A complete electric light plant is being fitted, and a large number of new machine tools have been ordered. The necessary power is supplied by two 60 horse power high-pressure boilers of special design, built on the premises, with a compound engine of the latest type. The boilers are tested to 1,400 pounds per square inch; steam to 300 pounds pressure being sometimes raised for testing purposes. The exterior of the building is faced with tooled granite to a height of 8 feet from the pavement, while the granite extends to the third story of the tower, the remainder of the fabric being of brick, with terra cotta ornaments. A really beautiful doorway, with handsome wrought-iron grille gates, gives entrance from Twelfth street. The building will probably be completed by January 1, and meanwhile work is carried on in the finished portion.

The Columbus Mfg. Company, Columbus, Ohio, have removed from their old site to more commodious quarters, occupying build-

ings 70 x 400 as factory and 130 x 50 as warehouse and shipping department, adjoining main lines of railroad, from which switches lead directly to the doors. This move gives the company 50 per cent. more output capacity than formerly, yet the firm have for some time been running night and day to keep up with their orders.

The works of the Aetna Iron Company, Norfolk, Va., were destroyed by fire last week. Loss, \$8000.

The shops of the Richmond, Fredericksburg & Potomac Railroad Company at Richmond, Va., were burned last week at a loss of \$20,000. They will be rebuilt at once.

The Derrick & Harvey Machine Co., Baltimore, Md., report a full hand of work, with active inquiry. Their shops are busy on experimental machinery and working up of stock in the company's special line of tools. A number of their heavy open side planers have been shipped during the present month to the order of various parties, including one for the Fulton Iron Ship Building Works at San Francisco; one for the Hanover Machine Works, Hanover, Pa.; one for Bowen Bros., Phillipsburg, Mont., and another of the heaviest description for the Cortright Hydraulic Machinery Co., Benton, Harbor, Mich. They have also completed a large threading and slotting machine for operating rifled guns, which will be shipped to the United States Arsenal, Watervliet, N. Y., as soon as the Government officials are prepared to receive it. Detrick & Harvey Co. have in hand an order for a large amount of special machinery for ice making by the vacuum process, as well as a number of machines for cotton and paper mills, cigar factories, &c., which keep their shops fully employed.

The Cahill Iron Works, Chattanooga, Tenn., are full of orders and report a very active demand for their goods, especially for structural iron. They are erecting a new building to increase their capacity.

The new foundry of Gaar, Scott & Co., at Richmond, Ind., is almost completed. Its dimensions are 200 x 100 feet, and, together with the old structure, will make the largest foundry in that State.

The Straight Line Engine Company of Syracuse, N. Y., has taken possession of a new addition to its machine shop. The new structure is 96 x 64 feet in size, and with the additional facilities the company hope to be able to shortly catch up with orders.

Jacob Brombacher's Sons, manufacturers of tinmiths' tools, machines, paper box machinery, &c., have removed from 20 Cliff street, where they have had their salesrooms for the last 15 years, to larger and more convenient quarters at 30 Cliff street.

Reeves Bros., proprietors of the Reeves Boiler Works, at Niles, Ohio, will add a hydraulic riveting plant to their works; also a flanging plant and a plant for building structural shapes for bridges, iron buildings and roofs. Machinery to the value of \$25,000 will be put in, and the works moved to a new location, where they will occupy a site of 20 acres.

The J. C. McNeil Boiler Company's plant, which was destroyed by fire recently at Akron, Ohio, will be rebuilt.

The iron and brass foundry of Alva Carpenter & Sons at Providence, R. I., has been destroyed by fire. The loss is placed at \$30,000; insurance \$14,000.

Miscellaneous.

It is stated that the Pennsylvania Zinc & Iron Company have decided to erect a furnace during the winter at Roanoke, Va. This company are now completing an ore washer at their mines with a capacity of 200 tons of ore daily. Their furnace will have a capacity of 10 tons of oxide of zinc per day.

A party of Northern capitalists with \$50,000 capital have purchased the plant of the Midway Iron Company at Roanoke, Va., for \$7000. The purchasers bind themselves to operate the plant at its full capacity for five years.

The Schultz Belting Company, St. Louis, Mo., have recently finished for the Union Depot Railway Company, St. Louis, two 54-inch double belts, which are to replace two oak belts. This concern have also shipped 4000 feet of belting to Moscow, Russia; 6000 feet to London, England; 3000 feet to Halifax, England, and 3000 feet to Sundsvall, Sweden.

The King Bridge Company of Cleveland, Ohio, are furnishing several extensive iron and steel roofs for the Grasselli Chemical Company of Cleveland, Ohio, and the Elk Rapids Company of Elk Rapids, Mich. The same company also have under contract with the Pittsburgh, Shenango & Lake Erie R. R. Company a hoisting and conveying plant for handling ore, coal, &c., at their new docks at Conneaut, Ohio.

TRADE REPORT.

In all the primary markets Pig Iron is reported to be quiet, but quite steady. Transactions are not numerous or large because the majority of buyers have pretty well covered, while the sellers are satisfied with the present condition of their order books.

Very conflicting accounts are heard concerning the Billet market. While it is conceded that the Pittsburgh and Wheeling makers are accepting lower prices, our correspondent quoting a sale of 6000 tons for forward delivery at \$23.25, it is an undoubted fact that away from home some of the makers in that district are quoting very low figures. There is good evidence that \$21.50 and \$21.75 have been named. The movement is very light in any case, but unless there is another rush of buyers, or a return of some mills to other work, there is some probability that low prices will again be made, at least for a short time.

The Steel-Rail mills report little that is encouraging. The Colorado works are said to have booked 25,000 tons for the C., B. & Q. Railroad, business which would naturally go to the Chicago mills.

In Finished Iron and Steel the resumption of full work at Homestead brings into the market a mill with very large capacity, which is expected to have its effect in the Beam and Plate trades, where there has been some uneasiness for some weeks past.

In the Eastern markets Bars are weaker and the competition among local and distant mills is very keen. The same is true in Merchant Steel, in which New England particularly is the battle ground, very low prices being named. Cut Nails have during the past few weeks recorded exceptionally low figures; \$1.30 per keg at mill has been done under exceptional circumstances, and \$1.35 was an open quotation at one time.

There have been quite liberal sales of Lake and other Copper at good prices, for home and export trade, but the report of a transaction involving 6,000,000 pounds for the first six months of next year at an advance still lacks confirmation.

Tin had a slump last week, but under the support of the leading speculative interests recovered and is now quite steady.

Lead is weakening still under a moderate business and Spelter seems to lack any strength whatever.

There have been some sales of Tin Plate for delivery next year, but otherwise the market is quiet.

Philadelphia.

Office of The Iron Age, 230 South Fourth St.
PHILADELPHIA, Pa., November 22, 1892.

The general market shows a degree of firmness which is somewhat surprising, considering the very general disappointment in regard to the election. But a great deal of material is being consumed, so that purchases have had to be made regardless of political predilections. The feeling under these conditions is a little inclined to drift back to what it was previous to the election, viz: confidence in values, and expectations of a large volume of

business. The conditions appear to be favorable, and while prices may not change to any appreciable extent, all the indications seem to point to activity, although as the holiday season draws near, there will doubtless be more or less of an interruption, and possibly some irregularity in prices, but taking everything into consideration prospects are not discouraging.

Pig Iron.—Goods brands of Iron are well sold up, so that there is no immediate chance for lower prices, while in some instances holders are inclined to ask a slight advance. Ordinary and medium qualities are also pretty well taken up, so that the entire market for Pig Iron has a steady appearance. Production is increasing, however, so that it is not likely that any very pronounced movement in the direction of higher prices will be made, particularly as manufacturers and others will endeavor to clean up stocks toward the close of the year. At the same time those who are looking for lower prices will find very little encouragement under present conditions, so that for a while at all events, the market will be likely to drift along at something very near to the figures now ruling, as there is nothing to induce speculative ventures on either side. Prices about as follows for seaboard deliveries, and at 25¢ @ 40¢ less for Southern brands delivered at points 50 to 100 miles South or West:

American Scotch, No. 1x.....	\$17.00 @	\$17.50
American Scotch, No. 2x.....	16.00 @	16.50
Standard Penna. (Lake Ore), No. 1x.....	15.25 @	15.75
Standard Penna. (Lake Ore), No. 2x.....	14.50 @	14.75
Standard Penna. (Lake Ore), No. 2 plain.....	13.50 @	13.75
Medium Quality, No. 1x.....	14.50 @	14.75
Medium Quality, No. 2x.....	14.00 @	14.25
Standard Virginia, No. 1x.....	14.75 @	15.00
Standard Virginia, No. 2x.....	14.00 @	14.50
Virginia and Southern, No. 1x.....	..... @	14.50
Soft.....	..... @	14.50
Virginia and Southern, No. 2x.....	..... @	13.75
Standard Penna. and Virginia Forge.....	13.25 @	13.50
Ordinary Forge.....	12.75 @	13.00

Bessemer Pig.—There is a firmer feeling, and holders are not inclined to go below \$16 at furnace for standard qualities, but there is not much demand, and for that matter not much supply either.

Steel Billets.—Market firm for deliveries during the current year, and not much demand for anything of a later date. Sellers are feeling around for bids, but buyers are under an impression that current rates are too high, and are therefore not inclined to make offers likely to be acceptable to makers, so long as spot lots command \$26.50 @ \$26.75, which are today's prices for Schuylkill Valley or other nearby deliveries. Nominal quotations are about \$25.75 for January and February, but consumers hold off expecting to do considerably better before the close of the year. Sellers seem tolerably confident of their position, and in the meantime are not disposed to go much below the figure named, say about \$25.75 delivered for January, February and March, Schuylkill Valley or equivalent points.

Muck Bars.—Business is very quiet, and although good Bars are offered at \$25.50 @ \$25.75 delivered, it is difficult to find buyers, although at about \$25.25 a market might possibly be found for a few small lots.

Bars.—The demand is pretty fair on the whole, but there is so much gunning for business that it is impossible to maintain anything like uniform prices. Some of the best known makes command comparatively good prices, but in others there is a continual shrinkage in quotations, and business has in some cases been taken at the lowest figures on record. Under such conditions it is obviously impossible to give exact quotations, but as a rule 1.60¢ @ 1.65¢ at interior points, or 1.70¢ @ 1.75¢

at sea board are the general asking prices, but they are by no means uniform, and on a desirable order liberal concessions can be had.

Plates.—Business is in a very unsatisfactory condition, and mills that make a specialty of Tank or other low-priced Plates find it exceedingly difficult to meet them at anything like fairly remunerative prices. Mills that run on Boiler and other high-priced Plates are doing comparatively well, as they have a good line of work on their books, beside applications for quick deliveries, which, however, are extremely hard to secure. Briefly stated, the demand for ordinary Plates is disappointing, and, as work is getting scarce, prices are weak and declining. On the high grades business is comparatively active and prices pretty well maintained, general quotations throughout the list being about as follows for lots delivered:

	Iron.	Steel.
Tank Plates.....	1.85 @ 1.90¢	1.85 @ 1.95¢
Shell.....	2.20 @ 2.30¢	2.20 @ 2.30¢
Flange.....	2.70 @ 2.90¢	2.50 @ 2.60¢
Fire Box.....	3.00 @ 4.00¢	2.70 @ 2.90¢
Special qualities.....	.....	3.25 @ 3.75¢

Structural Material.—The demand for small lots is quite active, but large orders are not being placed to any extent at present. Mills have a great deal of work on hand, however, and will have all they can handle during the balance of the year. The outlook after that date is not specially bright, although there is no reason to expect any particular dullness, as some of the work which is now in abeyance will doubtless be placed before long. In the meantime, however, there is an evident desire on the part of some mills to secure all the business they can get, to which end prices have been shaded to almost the lowest of the low figures ruling during the earlier months of the present year. Nominal quotations to day are about as follows: Angles or Sheared Plates, 1.85¢ @ 1.95¢, delivered; Universals, 1.95¢ @ 2¢, and Beams, Channels or Tees, 2.20¢ @ 2.30¢.

Sheets.—The demand is well maintained, and holders have no difficulty in securing rates as follows, for best makes quick delivery:

Best Refined, Nos. 14 to 20.....	2.75¢ @ 2.85¢
Best Refined, Nos. 21 to 24.....	2.90¢ @ 3.00¢
Best Refined, Nos. 25 to 26.....	3.15¢ @ 3.20¢
Best Refined, No. 27.....	3.30¢ @ 3.40¢
Best Refined, No. 28.....	3.40¢ @ 3.50¢
Common, $\frac{1}{2}$ ¢ less than the above.	

Quotations given as follows are for the best Open-Hearth Steel, ordinary Bessemer being about $\frac{1}{2}$ ¢ lower than are here named:

Best Soft Steel, Nos. 14 to 20.....	3¢ @ 3 $\frac{1}{2}$ ¢
Best Soft Steel, Nos. 21 to 24.....	3 $\frac{1}{2}$ ¢ @ 3 $\frac{3}{4}$ ¢
Best Soft Steel, Nos. 25 to 26.....	3 $\frac{3}{4}$ ¢ @ 3 $\frac{1}{2}$ ¢
Best Soft Steel, Nos. 27 to 28.....	3 $\frac{1}{2}$ ¢ @ 4¢

Best Bloom Sheets, $\frac{1}{2}$ ¢ extra over the above prices.

Best Bloom, Galvanized, discount.....	@ 70 %
Common, discount.....	@ 72 $\frac{1}{2}$ %

Old Material.—There is a little better demand for some kinds of material, but the market is not one in which everything goes, so that price depends on what a buyer may happen to want, and what a seller may have to offer. General quotations, however, are about as follows: Old Iron Rails, \$18 @ \$19, delivered; Old Street Rails, \$19 @ \$20; Old Steel Rails, \$15 @ \$16; No. 1 Railroad Scrap, \$16 @ \$16.50; Philadelphia, or for deliveries at mills in the interior, \$16.50 @ \$17.50, according to distance and quality; \$8 @ \$9 for No. 2 Light; \$11 @ \$12 for Machinery Scrap; \$11 @ \$12 for Wrought Turnings; \$8 for Cast Borings, and nominally \$20 for Old Fish Plates, and \$13 @ \$14 for Old Car Wheels.

Wrought-Iron Pipe.—At the last meeting of the manufacturers base prices were changed as shown herewith, subject to the usual commission to dealers and jobbers. The demand is fairly active,

but mills could handle vastly more business if it was within reach: Butt, Black, 55 %; Butt, Galvanized, 47½ %; Lap, Black, 65 %; Lap, Galvanized, 55 %; Boiler Tubes, 65 % all sizes new list; Casing, 62½ % new list.

Pittsburgh.

Office of *The Iron Age*, Hamilton Building, }
Pittsburgh, November 22, 1892.

The event of the week was the ending of the long struggles at Homestead, Beaver Falls and the upper and lower Union Mills of the Carnegie Steel Company, Limited. For five months the fights were carried on by the Amalgamated Association in the hope that the firm would finally consent to recognize that organization, and the final surrender gives the firm a complete victory, and with the result that their various plants are now being operated with non-union men throughout. These include Homestead Steel Works, Edgar Thomson Steel Works, Duquesne Steel Works, Upper and Lower Union Mills and Beaver Falls Mills. In addition to these the thousands of coke ovens in the Connellsville region owned by the H. C. Frick Coke Company, which is an identified interest, are also operated with non-union labor throughout. Other firms will be quick to see the immense advantage, gained by the Carnegie Steel Company, Limited, and will undoubtedly take steps in the near future to conduct their business with non-union men. The situation in the Iron and Steel trades as given in our report of last week does not show any new features at this time, with the exception that a perceptible weakening in Soft Steel has taken place, both for delivery this year and the first three or four months of next year. Bessemer Pig is in good demand, and has been considerably strengthened by purchases of large blocks in the Mahoning Valley and Pittsburgh by an Eastern concern for delivery up to July 1 of next year. Bars, Structural Material, Plates, Muck, Bars and Skelp are in good demand, with prices ruling about as given last week.

Pig Iron.—In our issue of last week we referred to a sale of 12,000 tons of Bessemer Iron made to a street rail concern in Eastern Pennsylvania. We are now advised that this purchase has been increased to about 30,000 tons, with deliveries running up to October 1 of next year. This purchase has done much to improve the general tone of the market, and as a result makers have considerable confidence, and some are not inclined to book very heavily, believing that the recent advance will not only be maintained, but that still better prices in the near future are not improbable. In the Mahoning Valley Bessemer is held firmly at \$13.50, and reports of sales at even better figures are going. As the freight to Pittsburgh is 60¢ per ton, it practically establishes the price of Bessemer Iron here at \$14.10 for deliveries running into next year, while for balance of this year, \$14 f.o.b. cars, Pittsburgh, can be considered as the ruling price. Some of the best grades of Pittsburgh Bessemer Iron are exceedingly scarce, and one maker advises us that he has sold within the past ten days on a basis of \$14.25 Pittsburgh. Advances are that three stacks in the Mahoning Valley and one in the Shenango Valley now idle will be put in blast before the first of the year. The Raney & Berger Iron Company at New Castle are now running their blast furnace on Bessemer to be used in the Bessemer plant of the Shenango Valley Steel Company at that place. In Forge Iron the situation is the same as noted last week. A good demand is reported with \$12.50 Pittsburgh being maintained. There is less Pig Iron piled in the yards at Pittsburgh at this time than at any time

within this year, stocks of Forge Iron being reported as very light. We repeat quotations of last week as follows:

Neutral Gray Forge.....	\$12.50 @	12.60, cash.
All-Ore Mill.....	12.50 @	12.75, "
No. 1 Foundry.....	14.00 @	14.25, "
No. 2 Foundry.....	13.00 @	13.25, "
Charcoal Foundry No. 1.....	19.50 @	20.00, "
Charcoal Foundry No. 2.....	19.00 @	19.50, "
Bessemer Iron.....	14.00 @	14.15, "

In addition to the sale of 18,000 tons noted at the opening of this report, numerous smaller sales of Bessemer ranging from 500 to 2000 tons are reported at prices equal to \$14 and \$14.10, f.o.b. cars Pittsburgh.

Billets.—Since our report of last week a material weakening in the market has occurred, and Billets for balance of this year delivery, and also for delivery during the first three or four months of next year, are obtainable at considerably lower prices than have been ruling for some time past. The main reason given for this decline in prices is the material increase in production caused by the entrance of Edgar Thomson and New Castle into the market, the effects of which are now being felt. In addition a number of the largest buyers are known to have filled their wants for some time to come, and this has resulted in buying of a hand to mouth character for a month or so. Several concerns within the past week have shown a disposition to again enter the market as sellers, and in order to obtain business offers have been made at prices considerably lower than have been offered for three or four weeks past. Buyers state that they have been approached with offers of Steel for delivery this year as low as \$24 at mill, although one or two sales were made last week on a basis of \$24.25 at makers' mill, Wheeling. We are also advised of a sale of 6000 tons made by Pittsburgh, equal deliveries during the first three months of the year, at a price said to be close to \$23.25 at works. For balance of this year Billets may be fairly quoted at \$24 @ \$24.50, while for the first three or four months of next year \$23.25 @ \$23.50 would be accepted by some makers.

Ferromanganese.—A fair demand is reported, with prices ranging from \$62 @ \$62.50 for 80 % Ferro, f.o.b. cars Pittsburgh. We note a sale of 250 tons at first-named prices.

Steel Plates.—We continue to note a fair run of orders with prices remaining about the same as noted last week. It is stated that Pittsburgh is securing a good many Eastern orders taken in competition with mills in Philadelphia district. The ending of the Homestead strike will, of course, mean a largely increased production of Plates in that plant. We quote prices as follows: Bridge Plates, 2¢ @ 2.10¢; Flange, 2.10¢ @ 2.20¢; Fire-Box, 3.50¢ @ 3.75¢; Tank, 1.75¢ @ 2¢; Shell, 2¢ @ 2.25¢.

Steel Rails.—No. 2 mill, better known as the old mill at the Edgar Thomson plant, has been started up on light rails, varying in weight from 20 to 45 pounds, and the Carnegie Steel Company, Limited, is now in position to fill orders for the above sized rails.

Structural Material.—Notwithstanding reports of the falling off in demand in Eastern and Western markets, Pittsburgh makers continue to advise us that a good many orders are coming in calling for delivery within the next 60 days. The labor troubles here this year have resulted in some curious features of the trade being brought out. A new building now being erected in Pittsburgh is being supplied with Beams by Chicago, while Pittsburgh has recently taken some orders for Beams and Channels for delivery in Philadelphia. The ending of the long strike at Homestead means a greatly increased output in the very near future by the Carnegie Steel Company,

Limited, which concern, as already known, are much the largest makers of Structural Material in this country. Prices remain about as quoted last week and are as follows: Beams and Channels from 2¢ to 2.10¢ for fair sized lots and 2.20¢ @ 2.25¢ for small lots. We quote Angles at 1.85¢ @ 2¢; Universal Mill Plates, 1.75¢ @ 1.85¢; Z Bars, 2¢ @ 2.05¢ and Tees, 2.25¢ @ 2.35¢.

Muck Bars.—The demand continues fair, and \$24 75, Pittsburgh, for No. 1 Bars is being maintained. In the Mahoning Valley advances are that a number of concerns, who before July 1 were large producers of Muck Bars, have been buying Soft Steel in preference to paying \$5.50 for boiling, claiming that Steel can be used to better advantage. The same is true of a number of mills in the Pittsburgh district, some of whom have not rolled a pound of Iron since the resumption of the mills in August last.

Skelp Iron.—The situation is much the same as noted for several weeks past. Three or four of the largest makers in this city are well sold up for some time, while a fair run of orders continues to be received. The activity in the Pipe and Tube trade during the last two or three months has had the natural effect of increasing very materially the demand for Skelp Iron. Prices are without change and we continue to quote Grooved Skelp Iron at 1.60¢ @ 1.65¢ and Sheared at 1.80¢ @ 1.82½¢, four months, or 2 % off for cash.

Wrought-Iron Pipe.—At the meeting of the Wrought Iron Pipe and Tube Manufacturers' Association, held in this city last week, a further advance in prices of 2½ % was made. The new list went into effect on Wednesday, the 16th inst., and is as follows: Black, butt weld, 55 and 10 %; Lap, 65 and 10 %; Galvanized, butt-weld, 47½ % and 10 %; Lap 55 % and 10 %; Boiler Tubes, all sizes, 65 %; Screw and Socket Casing, 62½ %; Inserted Joint Casing, 57½ %. The makers present at the meeting reported that trade was in very good condition, a large amount of business having been booked recently, with the outlook for the future very encouraging. Buyers and makers alike state that these prices are being rigidly observed.

Wire and Cut Nails.—A continued heavy demand for Wire Nails is reported, with prices remaining at \$1.50 in carload lots and \$1.55 in less quantities. For large blocks it is claimed the first named price would be shaded slightly. The Beaver Falls Mills, with a capacity of 2500 kegs per day, will be put in operation on Monday next, the 28th inst., the Rod Mill having started up yesterday. In Cut Nails the situation remains about as noted last week. Some very large purchases have been made recently, and prices continue on a basis of \$1.45 for 30 cent averages f.o.b. in Wheeling district, 60 days or 2 % off for cash. The Wheeling Mills are understood to be well fixed with orders, several of them having disposed of their output for the balance of this year. In less than carload lots \$1.50 on a 30 cent average is the ruling price.

Merchant Steel.—A fairly large trade is going, although orders are not as plentiful as they were a few weeks since. The demand for the cheaper grades of Steel is understood to be quite large, with prices remaining about as quoted last week. We quote Spring and Machinery Steel at 2¢ @ 2.10¢; Tire Steel, 1.90¢ @ 2¢; and Toe Calk, 2.25¢ @ 2.35¢; Tool Steel we quote from 6¢ upward, according to quality.

Barb Wire.—A fair run of orders continues to be received, and buying has been anticipated somewhat by the recent advances in Soft Steel. It is understood that one or two concerns have withdrawn some very low quotations, and are now

adhering to prices named below. We continue to quote Painted Barb Wire at \$2.10 and galvanized at \$2.45 @ \$2.50 in carload lots. For less than carload lots slightly higher prices than these are realized.

Wire Rods.—The Wire Rod department of the Beaver Falls Mills of the Carnegie Steel Company, Limited, started up on Monday, the 21st inst. It is understood the concern has sold largely for shipment West. We continue to quote prices at \$31.50 and \$32, with the first named as the ruling price.

Sheets.—While the demand seems to be as active as ever, prices have declined to some extent, and we now quote No. 24 Sheets at 2.60¢; No. 27 at 2.70¢, and No. 28 at 2.80¢, in carload lots.

Merchant Bars.—As an indication of how some of the mills in this vicinity are fixed with orders, we can cite the instance of a large firm in this city being offered a very good order by a Western railroad, for shipment during January and February, and was compelled to decline it on account of their product being virtually disposed of for those months. Mills generally in this vicinity report that the tonnage moving is very satisfactory, and while not as large as it was 30 or 60 days ago, sufficient business is being received to insure steady operations for some time to come. There is no doubt of the fact that the manufacture of Iron Bars in Pittsburgh is being fast superseded by Steel, a number of concerns not having rolled a pound of Iron since the resumption of operations in August last. We continue to quote No. 1 City Bars at 1.65¢ @ 1.70¢, and Old Rail and Scrap Bars at 1.50¢ @ 1.55¢, all 60 days, or 2% off for cash.

Scrap Iron and Steel.—When volume of business is considered, the Scrap trade is in better condition now than it has been for some months past, but prices have not improved to any great extent. Several weeks since a lot of No. 1 Railroad Wrought Scrap was sold on a basis of \$16, f.o.b. cars in this city, but since that time prices have fallen off to some extent. We are advised of the sale of 200 tons of No. 1 Railroad Wrought Scrap on a basis of \$14.75, f.o.b. cars Pittsburgh, or \$15.50 in the Mahoning Valley, 60 days. We quote No. 1 Wrought Scrap at \$14.75 and \$15 gross ton. Cast-Iron Borings are in good demand and are bringing from \$7.50 to \$8 gross ton. Wrought Iron Turnings we quote at \$10.50 gross ton; Leaf Springs are firm at \$21 gross ton, and Coil Springs \$18.50 gross ton, while Old Iron Axles are scarce at \$21 gross ton.

Old Rails.—A shortage in supply of short length Steel Rails is reported, and prices are firm at \$16, f.o.b. cars Pittsburgh. Long lengths we quote at \$15.75 @ \$15.85, and miscellaneous lengths at \$15.50 @ \$15.75. Old Iron Rails are scarce and we quote these at \$21, f.o.b. cars Pittsburgh.

Chicago.

(By Telegraph.)

Office of The Iron Age, 59 Dearborn street, CHICAGO, November 22, 1892.

Nearly every branch of the Iron trade exhibits a disposition toward quietness, which is attributed more to the approach of the end of the year than to the result of the recent election. Here and there a contract has been canceled for fear that prices may decline. But this is altogether exceptional and is caused by individual temperament rather than from a widespread apprehension. Prices show no general disposition to weaken, but in some cases there is a distinct tendency to firmness.

Pig Iron.—A fair amount of business is reported for the week in Coke Iron. Several good orders have been entered for both local and Southern brands, but buyers have not been disposed to purchase for long deliveries, except in cases where they have been covering actual requirements. This, in fact, may be said to be the foundation for all business just now, and the excellent volume shows how large the legitimate demand is. A few consumers have been impelled by their fears of lower prices next year to endeavor to cancel contracts, but they have not been successful in so doing. Prices are very firm on all kinds of Coke Iron, with the exception of some Southern brands produced by small companies, on which commissions of 15¢ @ 25¢ are now being made. This is not regarded as an evidence of any particular weakness, but simply grows out of an accumulation of a particular grade. The Lake Superior Charcoal market has been quiet, but firm; sales have been limited to an occasional carload order up to 100 tons, with only a few inquiries for nothing like round lots. The situation in Lake Superior Charcoal is very strong statistically. Stocks were reduced over 13,000 tons in October, and it is certain that an equally great reduction is now being made this month. The consumption of Charcoal Iron is very heavy and it is known that the largest consumers will require additional Iron to complete their contracts for the season. As the makers have their production covered for a considerable distance ahead, and as the output will not be increased for some time, the reduction in stocks bids fair to continue during the winter. The Lake Superior furnaces are thus in very much better shape to control the market than they have been for years. Quotations are as follows, cash f.o.b. Chicago:

Lake Superior Charcoal.....	\$16.50 @ \$17.00
Local Coke Foundry, No. 1.....	13.75 @ 14.25
Local Coke Foundry, No. 2.....	13.50 @ 14.00
Local Coke Foundry, No. 3.....	13.25 @ 13.75
Local Scotch.....	14.25 @ 14.75
Ohio Strong Softeners.....	16.25 @ 17.00
Southern Coke, No. 1.....	14.75 @ 15.25
Southern Coke, No. 2.....	13.85 @ 14.25
Southern Coke, No. 3.....	13.35 @ 13.60
Southern, No. 1, Soft.....	13.85 @ 14.25
Southern, No. 2, Soft.....	13.35 @ 13.60
Southern Gray Forge.....	12.85 @ 13.10
Southern Mottled.....	12.50 @ 12.75
Tennessee Charcoal, No. 1.....	16.50 @ 17.50
Alabama Car Wheel.....	19.50 @ 20.50
Coke Bessemer.....	14.50 @ 15.00
Hocking Valley, No. 1.....	17.00 @ 17.50
Jackson County Silvers.....	17.00 @ 17.50

Bars.—A firmer feeling is apparent among manufacturers. Reports are current that some buyers have been able to secure lower prices the past week, but this is disputed by the best informed sellers. They assert that close buyers have been obliged to pay 1.62½¢, and a case is known of one manufacturer who was obliged to pay 1.65¢ on some sizes which he needed to fill a contract. The valley mills are holding very firmly at 1.50¢ at mill, and it would require a very good specification to induce them to shade the above 50¢ gross ton. New business is by no means active, but the mills all appear to be very well supplied with work for the remainder of the year. Soft Steel Bars maintain their firmness in sympathy with the recent advance in Steel Billets, and are quoted at 1.70¢ @ 1.80¢, at Chicago. Store prices are unchanged at 1.80¢ @ 1.90¢ for Iron and 1.90¢ @ 2¢ for Soft Steel Bars.

Structural Iron.—No large orders have recently been placed, but the demand for small quantities of beams and angles keeps up very well. The outlook for the first quarter of the coming year is not very favorable to an active condition of business, but much depends on the winter, as an open winter will enable a great deal of construction work to be pushed which now seems likely to be postponed until spring. The price of Beams for mill shipment is 2.27½¢ @ 2.35¢; Chicago, while small lots sell at 2.50¢ @ 2.75¢ from

stock. Angles and Sheared Plates are unchanged at 1.90¢ @ 2¢, Chicago, for mill shipment. Small lots are quoted at 15¢ @ 20¢ higher.

Plates.—A few orders came up for shipment last week, but nothing heavy has transpired. The largest order now in sight is one of 150 tons for a Government vessel to be built at Dubuque. Competition for business is keen between some plate mills, while others are holding aloof on account of the higher price of material and are disposed to take their chances later on. Prices are unchanged, as follows: Tank Steel, 2.10¢ @ 2.15¢; Shell Steel, 2.17½¢ @ 2.25¢; Flange Steel, 2.30¢ @ 2.40¢. Quotations from stock are as follows: Tank Steel, 2.30¢ @ 2.50¢; Shell Steel, 2.60¢ @ 2.75¢; Flange Steel, 2.75¢ @ 3¢; Iron Sheets, Nos. 10 to 14 gauge, 2.45¢ @ 2.60¢; Steel Sheets, Nos. 10 to 14 gauge, 2.50¢ @ 2.75¢. Boiler Tubes are firm at 67½% discount.

Sheets.—A very good demand is reported by manufacturers' agents for Black Sheets. The demand this season appears to be much better sustained than in previous years. The mills are well supplied with orders and are not inclined to reduce quotations. The best price now to be had on good quality Common Black Sheets is as follows: Chicago delivery, No. 24, 2.75¢; No. 26, 2.85¢; No. 27, 2.95¢; No. 28, 3.10¢; No. 30, 3.55¢. Galvanized Iron is fully as scarce as ever, while manufacturers continue to receive good orders for mill shipments. Prices, however, have not been advanced, but are held at 70 and 7½% off for Juniata in carload lots or over. Jobbers quote 65 and 10% for small lots. Sheet Copper has not advanced, but is still selling at 30% off, with an active demand reported.

Merchant Steel.—The large mills report business quiet as usual at this time of the year. They are so well filled with orders, however, that if trade was active they would not be able to take any considerable amount of fresh business. Prices are unchanged at 2¢ @ 2.20¢ for Open-Hearth Machinery and Spring Steel, and 1.90¢ @ 2¢ for Tire Steel for mill shipment, Chicago delivery. Ordinary Tool Steel sells at 6¼¢ and upward. Jobbers report a large trade from stock.

Billets and Rods.—We quote nominally \$26 for Billets and \$35 for Rods, but the local manufacturers are unable to take further orders for delivery this year.

Rails and Track Supplies.—Manufacturers report a very quiet week. A few small lots have been sold, but inquiries for future delivery are lacking. Quotations are unchanged at \$31 and upward on such orders as are now being booked. Light rails are in comparatively good demand. Iron and Steel splice bars are unchanged at 1.75¢ @ 1.80¢; Track Bolts, 2.65¢ @ 2.75¢; for Hexagon Nuts and Spikes, 2.05¢ @ 2.10¢ for shipments from mill.

Old Rails and Wheels.—The only transaction in old Iron Rails reported the past week is a sale made by a local railroad at \$19, East St. Louis. This marks a higher level of prices than had been anticipated last week. Old Steel rails are in light demand at \$13 @ \$14.50, according to lengths. The situation in old Car Wheels is difficult to comprehend. Dealers are not inclined to quote more than \$14 @ \$14.50, and say that even at that price they would be taking chances on a loss in endeavoring to dispose of stock. The railroad companies, however, assert that they are able easily to obtain over \$15. It would appear from this that consumers were buying direct and railroads are establishing their own schedule of prices.

Scrap.—Quite a light demand is reported for Wrought, but prices have not receded, dealers being hopeful over the

outlook. Cast Scrap is in very good demand, with orders from out-of-town customers. Quotations unchanged as follows: No. 1 Railroad, \$17 @ \$17.50; No. 1 Forge, \$16 @ \$16.50; No. 1 Mill, \$11; Pipes and Tubes, \$10; Horseshoes, \$16 @ \$16.50; Sheet Iron, &c., \$6; Cast Borings, \$5 75; Wrought Turnings, \$8.50; Axle Turnings, \$10; Machinery Cast, \$11.50 @ \$12; Stove Plate, \$8; Malleable Cast \$10; Car Axles, \$18.50 @ \$19; Fish Plates, \$17.25; Mixed Steel, gross ton, \$10.50 @ \$11; Coil Steel, \$15; Leaf, \$16.50, and Tires, \$15.

Metals.—Carload lots of Lake Copper are quoted at 12½¢; casting brands, 11½¢; Spelter, 4 20¢ @ 4.30¢; Pig Lead, 3.62½¢ @ 3.67½¢.

Forster, Bickman & Hawes, The Rookery, Chicago, have secured the sole agency for the sale of the Sloss Iron & Steel Company's Pig Iron in the Northwest. The firm have for some time done a large business in the Sloss brand of Pig Iron, but not until lately were they able to secure exclusive control.

St. Louis.

Office of The Iron Age,
Bank of Commerce Building,
St. Louis, November 21, 1892.

Pig Iron.—The week under review has been extremely quiet, and sales reported are not large. Heavy consumers have supplied their wants for the balance of the year, and the smaller trade who buy from hand to mouth will continue to do so, and there does not seem to be any possibility of any further changes in prices, at least not until after the turn of the year. Consumers are kept busy and the consumption of Pig Iron bids fair to continue to increase; of course, the increase in December and January will of necessity be slight, but with these two months safely by, a smooth road is apparently in store for the market. In the meantime we quote as follows, for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	\$14.25 @ \$14.50
Southern Coke, No. 2 Foundry,	13.25 @ 13.50
Southern Coke, No. 3 Foundry,	12.75 @ 13.00
Gray Forge.....	12.25 @ 12.50
Southern Charcoal, No. 1 Foundry.....	15.75 @ 16.00
Southern Charcoal, No. 2 Foundry.....	15.50 @ 15.75
Missouri Charcoal, No. 1 Foundry.....	14.50 @ 14.75
Missouri Charcoal, No. 2 Foundry.....	14.00 @ 14.25
Ohio Softeners.....	16.50 @ 16.75

Bar Iron.—Business does not improve much in this department and prices are not so firm as last reported. Car manufacturers have covered their requirements for the balance of the year, and there does not appear to be much demand on the outside. Jobbers say they are fairly busy and that prices are unchanged. We quote as follows: Mills ask 1.62½¢ @ 1.65¢, half extras, f.o.b. cars East St. Louis. Jobbers quote 1.75¢ @ 1.80¢ from store.

Barb Wire.—This commodity does not appear as strong as last reported. Notwithstanding the advance in Billets, mills are offering Wire at prices that are even lower than those quoted before the advance in Billets. There are rumors that mills are endeavoring to come to some understanding with regard to prices, but at this writing nothing has been accomplished in this direction, and it is doubtful if anything will be accomplished. Trade is falling off with the approach of winter, and if present prices are maintained mills will consider themselves fortunate. Painted is quoted at \$2.20 @ \$2.25 from mill. Galvanized, \$2.65 @ \$2.70.

Wire Nails.—The demand for Wire Nails continues to be excellent, and prices are firmly adhered to at \$1.65 for carload quantities from mills. The proposed test

concerning the merits of the Wire and Cut Nail is not creating any interest in this locality, as the same ground has been gone over before, and nothing accomplished thereby. As one manufacturer expressed himself: "Test or no test, the dealer will continue to buy Wire or Cut Nails according to the demand which he has for each."

(By Telegraph.)

Pig Lead.—The market presents no new features. This metal is heavy and offerings are made at 3.57½¢, but at this price there is practically no business doing. Consumption shows a decided falling off, whereas there does not appear to be any decrease in production.

Spelter.—Business in this department is slow to improve. Sales are made at 4.15¢ for November delivery. A continued increase of stocks in smelters' hands precludes the possibility of any early improvement. At this season trade is naturally restricted so that the future of prices is very uncertain.

Cleveland.

CLEVELAND, OHIO, November 21, 1892.

Iron Ore.—The market has not fully recovered from the lethargy incidental to election, although some business has been done during the past week. Buyers are reaching out for odd and end lots of Bessemer at an average price of \$4 ½ ton, f.o.b. vessels lower lake ports. Some Non-Bessemer are going, too, a few sales being reported at figures close to \$3 ½ ton. The call for Ore from the furnaces continues fairly active and about 40,000 tons were sent forward during the past week as compared with 27,500 tons for the same week last year. The receipts of ore are falling off a bit owing to the near approach of winter and the early close of navigation. About 25,000 tons came down last week, however, and the shipments from now on until the close of navigation to all Lake Erie ports may not excel 75,000 or 100,000 tons. The railroads will attend to the rest and negotiations regarding rates by rail for winter shipments are already in progress. Some talk about prices for next season is already heard, and the next two or three weeks may develop something of interest in this particular. The ore dealers are now preparing their estimates of the season's business, the amount of ore sold and unsold, and the comparisons with former years. The output of the Lake Superior district for 1892 will be shown to have been considerably greater than the record for 1891, although it has not been as heavy as in 1890, when the totals went up to 9,000,000 tons. Ore rates have slightly advanced, as is always the case at this season of the year, with only one or two more trips possible.

Pig Iron.—The market does not retain the activity reported early in November, although light sales are reported at last week's quotations. Bessemer Irons show a little more life, and some transactions in Foundry Irons have taken place at slight advances over the quotations given out two weeks ago. Something of a demand for Soft Silvers is also noticeable. Dealers are hopeful of a better condition of affairs in the very near future, but at present announce these quotations:

Nos. 1 to 6 Lake Superior Charcoal	..... @ \$17.00
Nos. 1, 2 and 3 Bessemer, per ton	14.00 @ 14.25
No. 1 Strong Foundry, per ton	14.25 @ 14.50
No. 2 Strong Foundry, per ton	13.25 @ 13.50
No. 1 American Scotch, per ton	14.50 @ 14.75
No. 2 American Scotch, per ton	13.50 @ 13.75
No. 1 Soft Silvery, per ton	14.50 @ 15.00
Mahoning and Shenango Valley Neutral Mill Irons, per ton	12.50 @ 13.00
Mahoning and Shenango Valley Red Short Mills, per ton	13.00 @ 13.25

Old Rails.—The market is not active and prices for Old Americans are un-

changed. A few sales at \$18.75 @ \$19 are reported.

Nails.—Business has improved slightly, but prices are stationary at \$1.60 @ \$1.65 for Cut Nails and \$1.65 @ \$1.70 for Steel Wire Nails in stock.

Scrap.—The market is dull at unchanged prices.

A circular issued by Cleveland, Brown & Co., the well-known Cleveland Iron dealers, to their customers, under date of November 16, announces that they have disposed of their business to Bassett, Presley & Train of Cleveland, and that all orders on their books will be filled by the latter firm. For more than a quarter of a century the firm of Cleveland, Brown & Co. have carried on a business in Merchant Iron and Steel. Since the death of Mr. Cleveland, for more than a score of years the head of the house, the business has been carried on by Peter M. Hitchcock of Cleveland; Aaron M. Wilcox, of Painesville, Ohio, and Richard Brown, of Youngstown.

Cincinnati.

(By Telegraph.)

Office of The Iron Age, Fourth and Main Sts.,
CINCINNATI, November 22, 1892.

The general undertone of the Pig Iron market continues strong and confident, although there is no animation in the market such as would lead to large trading, but it is evident that more would be done but for the difficulty in obtaining cars to make prompt deliveries. This difficulty seems to be increasing rather than otherwise and is now the subject of more complaint than ever before. There are more ample offerings of No. 1 and No. 2 Foundry in Alabama, but not such as to indicate any weakness in the market, while Gray Forge is scarce and difficult if not impossible to obtain. Prices of all Southern Iron are firm and there is a fair volume of consumptive trade in progress, which in the aggregate is quite satisfactory, although in no individual instance is it large. There is rather less doing in Charcoal Iron, but a confident undertone prevails. There are offerings of Mahoning and Shenango Valley Iron to arrive at lower prices, but the quotation is little better than nominal. There is a great diversity of opinion expressed upon the effect of the change in political dominant sentiment of the country; but while there is some apprehension of a depressive influence upon the iron trade, there appears to be no disposition to curtail operations on the part of either buyer or seller. Quotations are unchanged, as follows:

Foundry.	
Southern Coke, No. 1.....	\$13.75 @ \$14.00
Southern Coke, No. 2.....	12.50 @ 12.75
Southern Coke, No. 3.....	12.00 @ 12.25
Ohio Soft Stone Coal, No. 1.....	16.00 @ 16.50
Ohio Soft Stone Coal, No. 2.....	15.00 @ 15.50
Mahoning and Shenango Valley.....	15.75 @ 16.75
Hanging Rock Charcoal, No. 1.....	19.15 @ 19.60
Hanging Rock Charcoal, No. 2.....	18.60 @ 19.00
Tennessee and Alabama Charcoal, No. 1.....	16.50 @ 17.00
Tennessee and Alabama Charcoal, No. 2.....	15.50 @ 16.00
Forge.	
Gray Forge.....	11.75 @ 12.00
Mottled Neutral Coke.....	11.25 @ 11.50
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel.....	18.75 @ 19.00
Lake Superior Car Wheel and Malleable.....	17.75 @ 18.00

Louisville.

LOUISVILLE, KY., November 21, 1892.

During October local buyers bought about all the Iron they can use for four months, and are not disposed to make further purchases, preferring to take their chances, when their necessities require additional Iron, of buying at close prices for prompt delivery rather than pay the

premium asked by furnaces for long future deliveries. The current healthy purchases together with the large decrease in stocks during October give the makers of Pig strong confidence in their ability through natural conditions to maintain prices. Short car supply is interfering with prompt shipping to a certain extent, but not a great deal of inconvenience has thus far been experienced. We quote cash cars, Louisville:

Southern Coke, No. 1 Foundry... \$13.50 @ \$14.00
 Southern Coke, No. 2 Foundry... 12.25 @ 12.50
 Southern Coke, No. 3 Foundry... 11.75 @ 12.00
 Southern Coke, Gray Forge... 11.25 @ 11.75
 Southern Charcoal, No. 1 Foundry... 15.00 @ 16.00
 Southern Car Wheel... 17.75 @ 19.00

New York.

Office of *The Iron Age*, 96-102 Reade street,
 New York, November 22, 1892.

Pig Iron.—Buying continues on a moderate scale only, but there is no marked pressure to sell. Consumers have well covered to the end of the year, while sellers are not particularly eager to commit themselves for next year at present prices. There is a movement on foot to secure control of a very large part of the available supply of Alabama and Tennessee Iron. We quote Northern brands at \$15 @ \$15.50 for No. 1; \$14 @ \$14.50 for No. 2; \$13 @ \$13.50 for Gray Forge, tide-water. Southern Iron, same delivery, \$14.75 @ \$15 for No. 1; \$13.75 @ \$14 for No. 2 and No. 1 Soft; \$13.25 @ \$13.50 for No. 2 Soft; \$12.75 @ \$13 for Gray Forge.

Ferromanganese.—There is some demand for quick delivery. Two sales of 600 tons each, in the Wheeling district, were captured by American producers, the \$2.40 freight rate from Baltimore making it impossible for Foreign Ferromanganese to hold that market against the prices made for Domestic material. We quote \$60.50 @ \$61 for Foreign Ferromanganese.

Billets and Rods.—Conflicting reports come from the West of prices at which Soft Steel is selling there. That some of the makers are looking for orders is evidenced by the fact that the Western Billets have been offered to a nearby works at a shade under \$24, delivered, the freight rate being \$2.50. We note a sale of a moderate-sized lot of Foreign Rods at private terms. We quote Foreign Billets, \$29.50 @ \$30; Foreign Wire Rods, \$40.25 @ \$40.50; Domestic Rods, \$34.25 @ \$34.50, and Soft Steel, \$24.50 @ \$25, tidewater.

Steel Rails.—Eastern mills report no new business of any consequence. The only news of special interest is the report that the Colorado Works have taken an order for 25,000 tons from the Chicago, Burlington & Quincy Railroad. Eastern mills still quote \$30 for Standard Sections.

Manufactured Iron and Steel.—The event of the week has been the collapse of the Homestead strike. As a result thereof, the Carnegie Steel Company announce that they will be in a position to deliver 15 inch Beams and smaller sizes in December, and 20 and 24-inch Beams in January. They have received applications for material in this market aggregating 2000 tons. Sellers report quite a fair run of small orders for prompt delivery in structural material, but no large contracts have been placed or are in sight for the near future. There is little doing in Plates, which display an easing tendency. Bars has sold as low as 1.65¢, delivered; for Refined, the sellers being Western Pennsylvania mills. We quote Beams at 2.35¢ @ 2.75¢ for small lots and 2.20¢ @ 2.50¢ for round lots, according to sizes; Angles, 1.95¢ @ 2¢; Sheared Plates, 1.85¢ @ 2.10¢; Tees, 2.30¢ @ 2.75¢; Channels, 2.25¢ @ 2.50¢, on

dock. Car Truck Channels, 2¢ @ 2.10¢. Steel Plates are 1.90¢ @ 2¢ for Tank; 2.20¢ @ 2.25¢ for Shell; 2.50¢ @ 2.65¢ for Flange; 2.6¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Refined Bars are 1.67½¢ @ 1.9¢, on dock; Common, 1.55¢ @ 1.60¢. Scrap Axles are quotable at 1.95¢ @ 2.10¢, delivered. Steel Axles, 1.95¢ @ 2.1¢, and Links and Pins, 2¢ @ 2.20¢; Steel Hoops, 1.90¢ @ 2¢, delivered.

Track Material.—We quote Spikes, 1.90¢ @ 2¢; Fish Plates, 1.60¢ @ 1.65¢; Track Bolts, square nuts, 2.40¢ @ 2.60¢, and hexagon nuts, 2.70¢ @ 2.80¢, delivered.

Merchant Steel.—Eastern mills complain of very sharp competition on the part of Western mills, both in this and in the New England markets. Rolled Shafting, 1½ to 4-inch, has sold as low as 1.75¢ @ 1.80¢, while Tire is quoted 1.95¢ @ 2¢; Sleigh Shoe, 1.80¢ @ 1.85¢, and Toe Calk, 2.20¢ @ 2.25¢.

The East Lebanon Iron Company, manufacturers of Muck Bar and Merchant Bar Iron at Lebanon, Pa., have opened an office in room 26, 239 Broadway. The company are now building an extra heating furnace, which, when completed, will give the mill a daily capacity of 40 tons of finished Bars. The plant now contains eight double puddling and two heating furnaces.

Metal Market.

Copper.—Fairly large sales have been made of Lake Superior Ingot and common Casting Copper for delivery during the months of December and January. The Lake product went at 12¢ and the Casting Copper at 10½¢ @ 11¢. Transactions involving about 3,000,000 pounds could be traced out, but there is reason to at least suspect that the contracts closed since the 15th inst. involve a larger quantity, including more or less Matte and Ingot for export. The freer buying is attributed chiefly to statistics of production the world over, showing a considerable shortage as compared with well-known capacity, and bearing *prima facie* evidence that, while there may be no international combination as alleged, there has been a curtailment of output the world over that is most remarkable as a mere coincidence. It is only suggestive in this connection that prices have advanced more sharply in the European markets than on this side of the ocean. Toward the close of the week the report had circulation that about 6,000,000 lb. of Lake Superior product adopted for electrical purposes had been sold for delivery during the first half of next year at 12½¢ @ 13¢ lb. Inquires at the proper sources for information failed to draw out confirmation of the accuracy of the report. As a matter of fact, the local representative of the supposed sellers denied having information of any such deal or of over 12¢ having been paid. That Wire Bars have been sold at above 12¢ in moderate quantities is the fact, however, and at the close 11½¢ was reported to have been paid for common Casting Copper in carload lots, showing, altogether, a quiet strong market.

Pig Tin.—Directly after the date of last week's review sales of Straits Tin were made at as low as 20½¢ net cash for current month delivery, and for a time the market presented a rather demoralized appearance. Subsequently the London manipulators came to the rescue, their local satellites followed the cue and prices were moved up here in response to higher figures cabled from abroad. The insiders in the speculative ring meanwhile recorded transactions aggregating about 250 tons, chiefly November and January delivery, but local interest was otherwise moderate,

and sales to the out-of-town trade hardly up to the average of the preceding two or three weeks. Stocks here and in Europe and the statistical position is the reverse of favorable for a strong market. At the close on Tuesday prices were firm, with 20.30¢ bid, and limited quantities offered at 20.35¢ net cash, in 10-ton lots, for prompt and current month delivery.

Pig Lead.—The Pig-Lead market has remained very soft and no facts have come to the surface that would encourage hopes of an immediate turn for the better. To the contrary, there is a degree of indifference on the part of large consumers and anxiety in some quarters to sell that is rather suggestive. Round lots have been sold to the extent of about 500 tons during the week at 3.80¢ @ 3.85¢, and the indications were that more could be obtained at the inside figures on a firm bid. At the close there were free offerings at 3.80¢ for delivery during the balance of the year. Official sale for making bullion price was at 3¼¢.

Spelter.—Western brands have been openly offered at 4.45¢, in carload lots for prompt shipment or delivery any time during the next few months. Back of that is anxiety for business and unmistakable evidence that a burdensome supply has accumulated from the enormous production of the past nine months. Altogether, the market presents an unenviable appearance, since home consumers buy very indifferently, while outlet in other directions is extremely narrow.

Antimony.—Competition in this line has been somewhat livelier, chiefly under the influence of more liberal supplies. Demand is slow and prices are rather weaker. Current quotations are 10¼¢ @ 10½¢ for Hallet's, 10½¢ @ 11¢ for LX, 11¢ @ 11½¢ for Crown and 11½¢ @ 11¾¢ for Cookson's in round lots.

Tin Plates.—Very fair sales have been made in Coke Finish Plates for delivery during the first half of next year, but operations in other varieties have continued on a very moderate scale. Spot business has differed in no marked degree with the general run previously this month, and the demand at present is of routine type. Full weight Cokes, Steel and Iron are scarce and the assortment of Ternes is still poor. Values have undergone no decided change. We quote spot prices as follows: Coke Tins—Penlan grade, IC, 14 x 20, scarce; J. B. grade, do., scarce; Bessemer full weight, scarce; light weights, \$5.15 for 100 lb, \$5.05 for 95-lb, \$4.80 for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60 @ \$5.65; Siemens Steel, IC basis, \$5.75; IX basis, \$6.80 @ \$6.85. IC Charcoals—Melyn grade, ½ x assortment, \$6.40; Crosses, \$8; Allaway grade, any assortment, \$5.70; Crosses, \$7.10; Grange grade, any assortment, \$5.80; Crosses, \$7.20. Charcoal Ternes—Worcester, 14 x 20, \$5.70; do., 20 x 28, \$11.40; M. F., 14 x 20, \$7.75; do., 20 x 28, \$15.75; Dean, 14 x 20, scarce; do., 20 x 28, \$10.80; D. R. D. grade, 14 x 20, \$5.35; do., 20 x 28, \$10.60; Alyn, 14 x 20, \$5.40; do., 20 x 28, \$10.70; Dyffryn, 14 x 20, \$5.65; do., 20 x 28, scarce. Wasters—S. T. P. grade, 14 x 20, \$5.10; do., 20 x 28, \$10; Abercarne grade, 14 x 20, \$5; do., 20 x 28, \$9.80.

The works of the American Tin Plate Company at Elwood, Ind., were erroneously reported to have suspended operations indefinitely last week. The stoppage is announced by the company as only temporary, pending the erection of additional machinery and some necessary alterations in that already erected. The managers assert that they intend to increase their capacity according to their original plans, without regard to the political situation.

Coal Market.

Anthracite Coal costs more than it did a week ago. That is to say, there is not so much outside Coal in competition with the combine. Whereas, a week ago the independents were selling in some instances 50¢ below the schedule, the difference now is less. Thus it comes about that while the combine know of no variation, it becomes necessary to quote outside Coal as an index of the market. Interior points which are liable to be soon closed to navigation are now well stocked up, but points like Boston are still holding off, buying only when they must.

The production is of late kept in check proportionate to the demand. The Wyoming operators at Scranton will shut down two days in the week until there is more activity in the market. The production by regions for the week ending November 12, compared with the same week last year, is as follows:

Region.	1892. Tons.	1891. Tons.
Wyoming region	464,522	528,082
Lehigh region	128,477	147,343
Schuylkill Region	251,040	364,588
Total	844,039	1,044,013
Total for year to date...	36,600,000	Inc. 1,312,000

A dispatch from Wilkesbarre says an important deal was consummated 19th inst. between the Pennsylvania Railroad and the Kingston Coal Company, by which the former agrees to handle all the Coal mined by the latter for the next five years. This means that the three large mines at Plymouth and Edwardsville will be worked to their full capacity, which is about 100,000 tons a month. The Pennsylvania is extending its lines in the direction of Mt. Carmel and Shenandoah.

Bituminous Coal is active and in greater demand, so that Bituminous and Clearfield products sell with but little difference in price. The call is still for more Coal, and supplies will be scant until sufficient cars can be had.

By a recent decision of the Philadelphia & Reading Railroad management all the old style black Coal cars must be done away with before January 1, 1894, to be replaced by self-coupling hopper cars.

The Pennsylvania Railroad reports for the year 12,447,700 tons of Coal, an increase of 622,000 tons. Reading sent 39,000 tons to Port Richmond last week and 58,000 tons to New York.

Financial.

There is more confidence in the business outlook now that fears of disturbing legislation have, in a measure, subsided, and, while the mild weather has lessened the demand for some commodities, it has been favorable in prolonging the season of inland navigation. The fact is noted with satisfaction that the total bank clearings of leading cities throughout the country show an increase of 9% over those of the corresponding week a year ago, the improvement being especially marked in New York. The reduced business in New Orleans reflects the labor troubles in that city, now happily closed by the interposition of the Governor. The deliberations of the International Monetary Conference, which began at Brussels on Tuesday, are not regarded with much hopefulness. A Wall street writer says that practical bimetalism, without the concurrence of all the great commercial nations of Europe, is conceded by everybody to be impossible, and the change by this country from the single gold standard to the single silver standard, with the enormous scaling down of public and private debts which it would entail, is demanded by only a small minority of

our citizens. In commercial centers the probable fate of the anti-option bill excites more immediate solicitude, as shown by the action of several large exchanges. Respecting the Government finances Secretary Foster gives an assurance that no deficiency can occur before the end of the year. The United States Treasury's regular balance decreased net during the week \$1,878,037, the net outgo of gold being \$1,455,936, indicating the first turn in the Treasury specie movement since the opening of September.

The recent action of railroad presidents designed to re-establish the pool dissolved some years ago is spoken of hopefully by railroad officials who believe it practicable to effect important economies without violating the Interstate Commerce law. Speculation in the produce market has been comparatively tame, except as to cotton, which experienced a decided boom, due to an advance in Liverpool, attended with heavy buying orders. The improved movement was aided by the report that Statistician Neill had reduced his crop estimate by 200,000 bales, thus bringing it down to 6,500,000 bales. It may also be noted that the Charleston News fixes its crop estimate at a round 6,000,000 bales. Wheat, corn and oats are but slightly higher. The outward movement of wheat thus far during the crop year reaches 71,500,000 bushels from all ports during the four months from July 1, or about 12.5 per cent. of the estimated crop. Last year the exports for the same period were 85,371,000 bushels, or 13.3 per cent. of the crop.

The stock market has been irregular with a declining tendency. Talk about the probability of good exports had an unsettling effect early in the week and bears took advantage of a rumor that an extra session of the Fifty-third Congress would be called to revise the tariff. On Friday whisky was active and higher, and one feature in the afternoon was a sharp rise in United States rubber common, which was on that day quoted for the first time. On Saturday the market was generally stronger and so closed. Among the features of the week were the absorption by the Distillers' and Cattle Feeders' Trust of five outside distilleries. There appeared to be a good demand for railroad mortgages and for some of the best of the investment stocks. The fact is noted that the great number of industrial corporations with vast capitalization is becoming one of the larger features of Stock Exchange business. United States bonds were quoted as follows:

U. S. 4½s, 1881, extended.....	100¼
U. S. 4s, 1897, registered.....	114½
U. S. 4s, 1897, coupon.....	114½
U. S. currency 6s.....	107½

The money market was decidedly easier, banks and trust companies having loaned freely on time at 4½ @ 5½%, which is a shade lower than rates current at the beginning of the month. The fact is construed as evidence that bankers look for an easy market, at least until the close of the year, and does not indicate fear of gold exports, which some have predicted, and which seem improbable in the face of reduced rates of exchange. Rates are 4½% for 30 day; 5% for 60 to 90 days, and 6% for all longer terms. Mercantile paper is in good demand. Currency is returning from the West, exchange on this city being at a premium of 50¢ @ 75¢ in Chicago and St. Louis. The banks made a gain in surplus reserve last week of \$1,882,025, having added no less than \$2,620,300 to their holdings of specie. Last year they had a surplus of \$13,322,750, but in 1890 they were only \$89,750 above the 25% legal requirement. Loans contracted \$1,736,500.

The merchandise foreign trade of this country for the 12 months ending October

31 was the largest ever known. The following are the figures:

	1892.	1891.
Exports.....	\$992,844,000	\$927,910,000
Imports.....	866,805,000	819,022,000
Excess of exports.....	\$126,039,000	\$108,888,000

The excess of exports is more than \$17,000,000 greater than in the same period in the previous year. For two months the foreign trade has been unfavorable, but before the end of the fiscal year it is likely to improve.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, November 23, 1892.

Pig-Iron warrants have ruled lower, Scotch selling off to 41/6, Cleveland to 37/, and Hematite to 46/6. The stock of Scotch in public stores has decreased to 349,000 tons, but the movement in Cleveland Iron has turned and an increase of 757 tons is noted in public-store holdings during the week. Speculation has been livelier at intervals, but outside operations are checked by the heavy output of furnaces in the Cleveland district.

Pig-Tin prices dropped during the early part of the week, but subsequently reacted 7/6 @ 10/ from the lowest point. Improved demand for Tin Plate imparted a better tone, but outside operators are very cautious, owing to the fact that supplies are in few hands and the market dependent in a good measure upon American operations.

Copper has advanced about 10/ and the market shows improvement in tone and statistical position. Further purchases of furnace material by American operators have served to stimulate business, while improvement in home consumption has served to increase confidence in the future of the market. Recently about 200 tons American Matte were sold at 9/3, but holders' views are now higher.

In Tin Plate there have been several large transactions at full prices, but business generally is difficult; makers' ideas regarding prices deterring buyers, the most of whom refuse to operate except at old rates. They take the view that the asking rates cannot be supported in view of present stocks and increase of output. Six works recently idle have been put in operation, and the owners are rapidly placing Plates upon the market. Stocks at Swansea are about 210,000 boxes, against 195,000 boxes at the corresponding period last year.

Scotch Pig Iron.—Business moderate and prices somewhat irregular, but showing only slight changes:

No. 1 Coltness, f.o.b. Glasgow.....	55/
No. 1 Summerlee, "	53/
No. 1 Gartsherrie, "	52/
No. 1 Langloan, "	53/
No. 1 Carnbroe, "	44/
No. 1 Shotts, " at Leith.....	53/
No. 1 Glengarnock, " Ardrossan.....	49/6
No. 1 Dalmellington, "	49/
No. 1 Eglinton, "	46/6

Steamer freights, Glasgow to New York, 1/; Liverpool to New York, 7/6.

Cleveland Pig.—The market has been very quiet and prices are rather weak at 37/3, f.o.b. shipping port, for No. 3 Mid-dlesborough.

Bessemer Pig.—Rather dull market and prices weak at 48/6 for West Coast

brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Ferromanganese.—There has been quite a good business and the market is firmer. English 80 % quoted at £11. 11/3, f.o.b. shipping port.

Steel Rails.—Makers have shaded prices and the market continues dull. Heavy sections quoted at £4, f.o.b. shipping port.

Steel Billets.—A moderate business passing and prices easy. Bessemer, 2½ x 2½ inches, quoted at £4, f.o.b. shipping point.

Steel Blooms.—There is very little doing and prices favor buyers. Makers quote £4 for 7 x 7, f.o.b. shipping point.

Steel Slabs.—The market remains dull and unchanged. Bessemer quoted at £3. 17/6, f.o.b. at shipping point.

Old Iron Rails.—No further change in prices and business moderate. Tees quoted at £2. 10/ @ £2. 12/6 and Double Heads at £2. 15/, f.o.b.

Scrap Iron.—The demand slow and prices barely steady. Heavy Wrought Iron quoted at £2. 2/6 @ £2. 5/, f.o.b.

Crop Ends.—Market very quiet and unchanged. Bessemer quoted at £2. 10/ @ £2. 12/6, f.o.b.

Manufactured Iron.—Prices generally quite steady, but the market slow. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff, Ordinary Marked Bars 8 5 0 @	6 10 0	6 12 6
" Common " " " " " " " " " " " "	6 10 0	6 12 6
Staff, Bl'k Sheet, singles.....	6 10 0	6 12 6
Welsh Bars (f.o.b. Wales).....	6 10 0	6 12 6

Tin Plate.—There is a quite good inquiry and makers are firm. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade.....	13/6 @ 14/
IC Bessemer Steel, Coke finish.....	12/3 @ 12/6
IC Siemens " " " " " " " " " " " "	12/6 @ 12/9
IC Coke, B. V. grade 14 x 20.....	12/8 @
Charcoal Terno, Dean grade.....	11/9 @ 12/

Pig Tin.—Market closed firm but quiet. Straits quoted at £94. 2/6 @ £94. 5/ for spot and £94. 2/6 for three months' futures.

Copper.—The market firm at the close and fairly active. Merchant Bars quoted at £47. 2/6 spot and £47. 12/6 three months' futures. Best selected, £51.

Lead.—Business moderated and the market easy at £10. @ £10. 2/6 for Soft Spanish.

Spelter.—A fair business and prices firmer at £18. 17/6 @ £19. for ordinary Silesian.

PERSONAL.

J. Thorpe Potts, recently of Richmond & Potts of Philadelphia, Pa., has opened an office in room 501 Lewis Block, Pitts burgh, as consulting engineer. Mr. Potts will make a specialty of gas furnaces and gas producers.

Jno. H. Fleming, formerly superintendent of the New York Car Wheel Works, Buffalo, N. Y., has resigned to take charge of the Niagara Car Wheel Company of the same city. The latter company have been recently organized and are building an extensive plant.

The report of the treasurer of the Knights of Labor, submitted at St. Louis, states that the membership of the order has increased slightly during the past year

and is now over 260,000. Except slight balances due some general officers in salary, the general order is entirely out of debt. All its property is fully paid for and is worth \$100,000.

Price-Lists, Circulars, &c.

THE TOLEDO BICYCLE COMPANY. Toledo, Ohio: Bicycles. A line of Dauntless Safeties are illustrated, showing the Spring Fork, Rigid Frame, Pneumatic and Ladies' Dauntless Machines. Detailed views are given of the spring fork, chain adjustment, ball-bearing pedal and yoke. The company give a guarantee certificate with every machine, guaranteeing to replace, free of charge at their factory, any part that may break on account of defective workmanship or material, within one year from date of sale.

THE HERBRAND COMPANY, Fremont, Ohio: Gear Irons, Fifth Wheels, Body Loops, &c. They refer to their Fifth Wheel as the first and original Rear King Bolt Gear Iron, being the product of years of study and practical use. To their line of Body Loops they have added several new sizes that were demanded by the trade, making improvements in the shape and bend, and improving the finish.

W. E. LAPE, Syracuse, N. Y.: Rex Lawn Mowers. A circular gives illustrations of the Rex and Rex, Jr., Mowers, together with a number of testimonials from those who have sold and used the machines. These speak of the Mowers in the highest terms.

ATLAS MFG. COMPANY, New Haven, Conn.: Bradley Shelf Brackets and Atlas Coat and Hat Hooks. Their No. 3 price-list and circular illustrates and describes these goods.

JACOT & SON, New York: Musical Boxes. Illustrations and descriptions are given of these goods in a large number of styles, including instruments at all prices. Prominence is given to the Ideal Musical Box, a colored illustration being given on one of the first pages. Among the features of this box is the interchangeability of cylinders, by which any number of tunes can be furnished; cylinders of large diameter, giving longer tunes, and coupled main springs, which are much more easily wound by means of a crank instead of a lever. A price-list accompanies the catalogue.

KOCH ADJUSTABLE BRACKET COMPANY, Peoria, Ill.: Shiftable Brackets for shelving in stores. The above firm are making use of the new postal card with paid reply to call attention to their system of shiftable adjustable shelf brackets. They suggest to those receiving the card the idea of trying the new postal card, to see how it works.

GIBBS MFG. COMPANY, Canton, Ohio: Hardware Specialties. Their catalogue illustrates and describes the Gibbs, Canton, Acme, Favorite and Crown Lawn Rakes, Gem Nozzle Holder, German Potato Digger and Grape Hoe, Gibbs, Columbia, National and Imperial Post-Hole Diggers. On the cover of the catalogue is a bird's-eye view of their new factory, to which has been added new and specially designed machinery.

HULBERT FENCE AND WIRE COMPANY, St. Louis, Mo.: Art Wire and Iron Work. Their catalogue No. 15, though not of large dimensions, contains 48 pages, with over 200 cuts showing Art Wire and Iron Work in a great variety of designs. There is also a view of the exhibit of the company at the St. Louis Exposition. Illustrations are given of Fences, Inflexible Netting, Crimped Ribbon Wire Work, Ornate Ribbon Steel Lattice, Counter Guards, Office Scroll Work, Iron Scroll Work, Art Metal Work Designs, Gate, Railing and Banister Designs, Scroll Grills and Wickets, Stable Fixtures, Flower Stands, &c. In addition to the

above they handle Barbed and Plain Wire, Posts, Vases, Vanes, Tree Guards, Mats and in general all kinds of Wire and Iron Goods.

THE BAKER MFG. COMPANY, Evansville, Wis.: Monitor Wind Mills, Iron Pumps, Grinders, &c. Their illustrated catalogue and price-list shows the Steel Monitor Mill and Tower, Solid Wheel Monitor, Vaneless Geared Wheel, Feed Grinders, Iron Pumps, &c. The Steel Monitor is referred to as novel in design, simple and strong in construction, and as developing a large amount of power on account of its large wind surface. The pitman connections are so arranged as to give nearly two revolutions of the wind wheel on the up stroke and but little more than one revolution on the down stroke.

HAMMACHER, SCHELMER & CO., New York: Revised price-list, under date November 15, 1892, applying to their 1892 spring catalogue of Drawer Pulls and Fancy Brass Trimmings. A portion of the prices are printed in red ink, these goods being "close out," and the prices on the same are limited to the extent of the stock only.

THE YOST MFG. COMPANY, Yost's Toledo, Ohio: Bicycles. Their catalogue for 1893 contains illustrations of the Falcon No. 1, Falconess and the Falcon, Jr., a Combination Wheel for boys and girls; also a series of cuts showing the various parts of the machines. They will market their Wheels through dealers, and state in a circular letter to the trade that to this end they have combined the most modern improvements with the finest material obtainable, and placed the price within the reach of the masses. Their catalogue announces that they will be in a position to fill orders promptly and in quantity by January 1, 1893, and sample orders by November 15 to December 1.

THE FULTON TOOL AND MFG. COMPANY, Canal Fulton, Ohio: Wilson's Car Brake and Sprag for mine cars or pit wagons; Picks, Sledges, Wedges, Drills, Needles, Scrapers, Tampers, Coal Augers, &c. Illustrations and descriptions of these goods are given in their circular.

SANDWICH ENTERPRISE COMPANY, Sandwich, Ill., announce that they have concluded arrangements for manufacturing for the trade the coming season the Improved Rose Disk Harrow and Disk Cultivator. Each of these Implements are referred to as possessing features which are worthy of the attention of those who handle articles of this kind.

DUDLEY BROTHERS, Nashville, Tenn.: Guns, Ammunition, Sporting Goods, &c. Their catalogue No. 3 of 50 pages devoted to these goods contains illustrations and prices, showing a line of Guns, Rifles, Flasks, Shot Belts, Gun Covers and Cases, Holsters, Game Bags, Hunting Clothing, Shells, Gun Tools, Fishing Tackle, &c. It is stated that everything is carefully inspected before shipping, and that customers may rest assured that their orders will be filled correctly, and that goods upon receipt will be found in good condition.

THE J. M. CARPENTER TAP AND DIE COMPANY, Pawtucket, R. I.: Taps, Dies, Screw Plates, Tap Wrenches, Die Stocks, &c. Their catalogue and price-list illustrates Standard Threads, Machinists' Hand Taper, Nut, Machine Screw, Stove Bolt, Blacksmiths' Taper, Pulley, Stay Bolt and French's Adjustable Taps; Die Hobs, Pipe Taps and Reamers; Solid Bolt Dies, Carpenters' Adjustable Die Stock, Bit Brace Die Holder, Lathe Die Holder, &c. A drill-list, printed on heavy cardboard, is furnished by the company.

ATHOL MACHINE COMPANY, Athol, Mass.: Vises. Illustrations are given of a full line of the Simpson Vise, for all uses. These Vises are operated in the same manner as an ordinary Screw Vise, or can be instantly opened or closed the full length by a single movement of the hand, without the use of the screw, thus combining a quick adjustment with the advantages of a Screw Vise.

HARDWARE.

Condition of Trade.

THE PAST WEEK has been uneventful in trade matters, the situation being in all material respects the same as at our last report. The cold weather still further stimulates orders for seasonable goods, and while merchants' requirements have in good measure been covered for this line, many orders to complete assortments or meet special needs have been coming in to merchants and manufacturers. There is also a fair but not heavy demand for general Shelf Hardware with more than the usual business in heavy goods. Prices are without important change, with a slight tendency toward firmness in some goods that lie near the raw material. There is but little complaint in regard to collections.

Chicago.

(By Telegraph.)

The Hardware trade is in precisely the same condition as reported last week. Shelf Hardware is moving very freely, especially Builders' Hardware and House Trimmings, while cold weather goods are very active. Sharp winter weather is now prevailing all through the Northwest, bringing its own peculiar characteristics of trade. Prices continue very steady and quotations are almost growing monotonous. Heavy Hardware jobbers are jubilant over the large volume of business they are enjoying and say that November will be their banner month for this year. Collections are very good.

St. Louis.

(By Telegraph.)

Hardware business has improved during the past week. The weather is seasonable and there is a steady demand for Shelf goods, heavy Hardware and seasonable specialties. The constant demand from the country trade is remarkable and indicates a good condition, so far as they are concerned. Powder, Shot and Fire Arms are in excellent demand, and prices are fairly well maintained, with the exception of Powder, which is not as strong as last reported. Cut Nails and Wire Nails are weak, as is also Barb Wire. The Southern trade shows decided improvement during the past two weeks, and indications point to an increased trade in that section.

Notes on Prices.

Cut Nails.—The Cut Nail market appears to be in a somewhat better condition than last week, and there is something of a hardening, as the extreme figures named a week or two ago are now quite generally

withdrawn, and manufacturers are pursuing a conservative policy with reference to booking orders for future delivery. At the present time there appears to be more irregularity in price in the East than in the West, but it is understood that the Eastern mills are conferring with reference to a renewal of understanding in regard to prices with a view to correcting the unprofitably low prices which have prevailed since the Eastern market became an open one. Quotations are on a basis of \$1.40 to \$1.45 for carload lots at mill on a 35-cent average. Prices in New York City are \$1.75 to \$1.85, with a fair demand, to and \$1.60 to \$1.75, according to average, is quoted in carload lots, f.o.b. dock.

Chicago, by Telegraph.—Steel Cut Nails are in only moderate demand, with prices dropping. Local manufacturers are so well supplied with orders that they are maintaining quotations at \$1.62½ for 30-cent average, but competitors from distant points are naming lower figures. Jobbers continue to quote \$1.65 to \$1.70 from stock.

Wire Nails.—The Wire Nail market shows little change since our last review. There is still a fair demand, but orders for the most part are of moderate volume, the large purchasers having covered their requirements for some time to come. The market is represented by the quotation of \$1.50 for carload lots, f.o.b. mill, a figure which is shaded slightly by some of the mills. Small lots from store in New York are held at the usual advance.

Chicago, by Telegraph.—Wire Nails are not so active. Large buyers have either placed their orders or withdrawn from the market and the general trade are not doing much, so that business from the manufacturers' standpoint is not particularly cheerful. They report their order books well filled and expect to be able to tide over the usual dull period in December without much trouble. The open quotation for factory lots is still \$1.65, Chicago, but this is shaded. Jobbers quote \$1.75 for small lots.

Barb Wire.—The Barb-Wire market is in a somewhat unsatisfactory condition and is characterized by some irregularity. Some of the mills are endeavoring to obtain higher prices than have heretofore prevailed, and with some measure of success. Others, however, are adhering to former quotations, and there is thus some unevenness in the figures named by different manufacturers. It would appear, however, that it is not as easy as heretofore to obtain the low prices which have been current, and the market is represented by \$2.45 to \$2.50 for Four-Point Galvanized, f.o.b. mill. Prices in New York are still \$3.10 for small lots and \$3 in carloads.

Chicago, by Telegraph.—While some makers are endeavoring to hold quotations up to \$2.25, carload lots of Painted and \$2.70 for Galvanized, others are selling 10 cents cheaper and appear to have no intention of making the advance. The demand is fair for spring delivery. Jobbers quote small lots \$2.35 and \$2.80.

Stove and Tire Bolts.—A reduction has recently been made by the manufacturers in the price of Stove and Tire Bolts, a concession of about 10 per cent. having been made.

Rivets.—There has been no improvement in the Rivet market since our last issue, and there does not appear to be at this writing much prospect of an early agreement between the manufacturers. In the meantime, the large trade are placing their orders at figures which are a material concession beyond those which have recently been ruling.

C. E. Jennings & Co.—Under date, November 12, 1892, C. E. Jennings & Co. 87 Chambers street, New York, issue the following discount sheet applying to their catalogue of October 1. It will be observed that many new goods have recently been added to their line. Terms, net cash, 30 days:

	Discount.
Auger Bit Sets	.....25
C. E. J. & Co.'s Auger Bits, Nos. 10A, 30B	.....25
" " " " " " " "	.....40
" " " " " " " "	.....30, 35, 50&10
Noble's " " " " " " " "	.....32, .....60&10
" " " " " " " "	.....31, .....60
Clark's " " " " " " " "	.....53, .....60
Watrous' " " " " " " " "	.....111, .....50&10
C. E. J. & Co.'s Car Bits, " " " "	.....10, .....25&10
" " " " " " " "	.....30, .....50
Noble's " " " " " " " "	.....31, .....50&10
Excelsior " " " " " " " "	.....51, .....60&10
C. E. J. & Co.'s Dowel Bits " " " "	.....10, .....40
" " " " " " " "	.....30, .....50&10
" " Machine " " " " " "	.....40
Excelsior Auger Bits, No. 51	.....75
Handled " " " " " " " "	.....40
Machine Bits and Hub Augers	.....25
C. E. J. & Co.'s Expansive Bits	.....33½
Clark's " " " " " " " "	.....33½
C. E. J. & Co.'s Nut Augers, No. 30, ½ to 2½ inch	.....50&10
C. E. J. & Co.'s Nut Augers, No. 30, 2¾ to 4 inch	.....50
C. E. J. & Co.'s Nut Augers, No. 33, ¾ to 2 inch	.....50&10
Noble's Nut Augers, No. 31, ½ to 2½ inch	.....60
" " " " " " " "	.....2¾ to 4 inch, 50&10
" " " " " " " "	.....32, ¾ to 2 inch, 60&10
" " " " " " " "	.....2¾ to 4 inch, 60
Excelsior " " " " " " " "	.....51, ¾ to 2 inch, 75
" " " " " " " "	.....2¾ to 4 inch, 60
" " Long Eye Augers, No. 42	.....60&10
" " Short " " " " " "	.....43, .....60&10
C. E. J. & Co.'s Long Eye Augers, No. 39, 50&10	
Watrous' " " " " " " " "	.....40, .....60
Noble's " " " " " " " "	.....41, .....60
C. E. J. & Co.'s Boring Machine Augers, Nos. 30, 33	.....50&10
Noble's Boring Machine Augers, No. 31	.....60
" " " " " " " "	.....32, .....60&10
Excelsior " " " " " " " "	.....51, .....75
L. H. Ship " " " " " " " "	.....34, .....15
C. E. J. & Co.'s Gas Fitters' Augers, No. 36	.....25
" " " " " " " "	.....37, .....50
" " " " " " " "	.....38, .....50
L'Hommedieu's Ship Augers and Bits	.....15
Tracy's Trenail Augers	.....15
" " Scotch Pattern Augers	.....15
Watrous' Ship Augers and Bits	.....25
C. E. J. & Co.'s Chisel Sets	.....25
Merrill & Wilder's " " " " " "	.....25
C. E. J. & Co.'s Socket Firmer Chisels, No. 70	.....25

C. E. J. & Co.'s Socket Firmer Chisels, No. 7.	25	"Hinsdale" Plane Irons, Nos. 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849
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tion to the capacity of each factory. The order, it is stated, will go into effect January 1, 1892. A statement was made at the meeting embodying the following figures, to show the condition of the Plate Glass business:

In 1891 the consumption of Plate Glass in the United States was 13,944,231 feet. This includes the imports, amounting to 3,611,000. For the 10 months of 1892 and for the year the consumption, based on a percentage of increase for the two remaining months, is over 15,000,000 feet, inclusive of the imports, 2,225,000. The total capacity of the factories in the country is 22,600,000 feet per year. To this amount must be added the imports of about 1,400,000 feet. I need not say that we are rapidly cutting off the imports and the tariff on our product has been the same for 30 years. Putting the consumption this year at 15,000,000 and next season at 16,500,000 feet, it is apparent that the visible supply of 24,000,000 feet yearly won't be used up. This is why curtailment is necessary, and the order for each factory will go into effect January 1.

Quotations are as follows: American Window Glass, 1000-box lots or more, 80 and 15 per cent. discount; carloads, 80 and 10 per cent. discount; less than carloads, 80 and 5 per cent. discount. French Window Glass, 75 and 10 and 5 per cent. discount. American Plate ranges in price from 50 and 10 and 7½ per cent. discount to 60 and 2½ per cent. discount. Imported Plate Glass 60 per cent. discount to 60 and 10 and 5 per cent. discount.

THE NEXT

Hardware Dinner.

THE TRADE will be glad to know that the officers of the Hardware Club of New York are already moving in the direction of a trade dinner to be held in the early part of 1893, a committee having been appointed for this purpose at their last meeting. It is obviously wise to take the matter in hand at this time, that there may be ample opportunity to make arrangements which will render the coming dinner a fitting successor to the one held last February, which was enjoyed by so large and influential a representation of the trade. We would suggest that while the last dinner was a notable gathering of the trade in the East, with not a few well known merchants and manufacturers from other parts of the country, efforts be made to secure the presence at the coming dinner of gentlemen prominently connected with the trade throughout the whole country, that the gathering may be to even a larger extent than any of its predecessors a national one.

Shipley's Cutlery Enamel.

A. B. SHIPLEY & SON, 503 Commerce street, Philadelphia, Pa., are putting up a Cutlery Enamel in convenient sized bottles. The Enamel is intended for marking the price, &c., on the blades of Pocket and Table Cutlery,

and is applied with an ordinary steel pen. The manufacturers state that the Enamel will flow from a pen as readily as ink flows on paper, that it will not blur or blot, that it will dry in two minutes, that it may be readily removed with a rag and powdered clalk or putz, when desired, without leaving a stain, and that it will not rust or corrode the finest crocus finish.

Export Notes.

MEXICAN IMPORTATIONS are increasing, the duties collected for October rising to \$1,700,427, showing a marked improvement. Financiers look with favor on the situation and predict a great revival of trade, giving as a reason that the common people now have cheap food and can spare something for other things.

President Diaz and Cabinet of Mexico recently attended the inauguration of the Mexican Southern Railway at Oaxaca, said to have been built on the line projected by General Grant years ago. American capitalists commenced it and English money finished it. It is said to tap a very fertile section of country.

The imports into Mexico for the fiscal year ended June 30, 1892, indicate there was received from the United States merchandise valued at \$20,000,000; from England, \$6,000,000; France, \$5,000,000, and Germany about \$3,000,000. The leading importations were in Cotton Goods, Food Products, Machinery, Woolens, Paper, Drugs and Chemicals. The free imports aggregated \$13,506,230, and those paying duty \$26,518,664. Duties received were \$22,477,962 ad valorem.

There appears to be trouble brewing in Hayti and, according to recent advices, it seems to be not far distant, although the present Government is extremely watchful, and any disturbances are promptly suppressed. The coffee crop has been gathered.

Rumors multiply that difficulties are ahead for Chili, in the direction of Peru on the north and the Argentine Republic on the east, and, according to unofficial advices, it would seem the only thing lacking is a pretext. The bone of contention appears to be largely in relation to the two southern provinces of Peru, namely, Tacna and Arica, the ten-year period which was to decide to which country (Chili or Peru) they should belong permanently expiring next October.

M. J. Guerin, Flint & Co.'s manager in Rio de Janeiro, who has spent the last three months in this country, has returned to his post, having left this port November 10 on the steamer "City of New York," for London, connecting at Southampton with steamer "Clyde," November 17, for Rio. His time here has been largely spent in conference with enterprising manufacturers who are desirous of

marketing more of their output abroad. He has been supplied with lines of samples of goods suitable for that market. Aided by the commercial treaty with Brazil, now in force, it is hoped that there will be a considerable increase in business with that country.

Hemenway & Browne, 47 Cedar street, New York, supplementing their regular sail line, expect to have the steamer "Bar-den Tower," of 1470 tons net register, for Talcahuano, Valparaiso and Antogozasta (calling at other West Coast ports if sufficient inducement offers), in loading berth by December 1, sailing December 10-15. With steamer freight averaging not to exceed a half more, this would seem to be preferable to sailing vessel, when it is about 45 days as against 90 days en route, better protection to cargo being afforded and with much less marine insurance.

William E. Peck, export commission merchant, 62 William street, has recently shipped two 75 horse power automatic engines to Talcahuano and has just received an order for another, together with a full line of wood-working machinery.

S. Hoffnung, of S. Hoffnung & Co., London, New York, Sydney and Brisbane, is now on a visit to this country from London, on business connected with their various branches, and expects to remain a month longer. It has long been the aim of this firm to enable Australian merchants to supply their entire wants from stocks carried in their Sydney and Brisbane warehouses.

Sir Roderick Cameron of R. W. Cameron & Co., a passenger on the steamer "Alameda" from San Francisco recently, stopped off for a trip through New Zealand, while W. H. Douglas of Arkell & Douglas, a fellow voyager, went direct to Sydney, arriving the first week in November. Australia and New Zealand freights are still ruling much below charter rates.

There is a feeling among representative and conservative houses having large interests in Australia that the worst there has passed, and while the improvement is not marked nor likely to be for some time to come, still the receipt of some cable orders recently would indicate superfluous stocks had been reduced and broken lines must be replenished. In this connection the point is made by many that the placing of wool on the free list would undoubtedly stimulate trade between Australasia and this country, as wool is practically all those colonies have to export. This would furnish return cargoes for vessels sailing from this country with manufactured wares, and enable this people to pay us partly in goods.

H. M. A. Haase of the Mercantile Corporation of the United States and South Africa, Haase & Vaughan, 140 Pearl street, New York, agents in this country, left here November 12 for Bremen on the steamer

"Aller." After transacting some business in Berlin he will proceed direct to Cape Town, South Africa, and spend about four months there in connection with the interests of the company to which he belongs.

The Coombs, Crosby & Eddy Company, export merchants, 78 South street, New York, publish three condensed illustrated summaries of news and prices for foreign merchants dealing in American manufactured goods—viz :

El Mundo De La Exportacion in Spanish for circulation in countries where Spanish is the language of commerce.

O Mundo Exportador, in Portuguese, for circulation in all countries where Portuguese is in use.

The Export World, in English, for circulation in countries in which English is largely spoken.

Advices from Chilean correspondents to New York commercial houses refer to a contraction of the paper currency and steps by that country in the direction of establishing itself on a gold basis—if practicable.

The American Public Health Association, whose members represent some 600 societies in the United States, Canada and Mexico, will follow the precedent established by the General Passenger Agents' Association in March, 1890, and hold their annual convention in the City of Mexico, commencing November 29, and continuing four days. Among the delegates will be A. L. Gihon, A.M., M.D., Medical Director United States Navy, representing the United States Government, and A. N. Bell, A.M., M.D., editor of the *Sanitarian*. Taken in connection with the increasing tendency of Americans to tour the country and business enterprises now on foot, it would seem to indicate that railroad facilities were constantly being extended and bettered, and that our merchants are more and more seeking a market there for products manufactured and grown here, a trade that has in the past been almost monopolized by Europeans.

In the table giving changes in Mexican tariff, published in our issue of November 3, the new rate of duty on Lime and Cement should have been given as 50 cents per 100 kilograms instead of as published.

The concession for bonded warehouses at Guayamas (on the Gulf of California in Northwestern Mexico), recently granted, has been ratified. It provides that on and after April 1, 1893, merchandise will be admitted from the United States to Nogales, free of duty, for transportation over the Sonora Railway (running from Nogales on the American border through the State of Sonora to Guaymas on the west coast), where it may be stored in bonded warehouses or forwarded by vessel to any of the Pacific ports, allowing import duties to be collected at the final port of entry. This concession will, doubtless, prove of much value to the Sonora Railway, making it an artery for a large territory, diverting to itself much of the extensive import

trade now supplied with American goods by steamer from the United States. It should also stimulate national shipping interests engaged in the coastwise trade.

Trade Items.

JEWELL BELTING COMPANY, Hartford, Conn., are putting on the market, in neat packages of 2, 5 and 10 pounds, the Jewell Dynamo Belt Cement, which they use in their factory. It is used for making leather belts endless, and for repair work, and if used according to directions, the manufacturers state no other fastening need be employed. With reference to the quality of the cement they say :

Most of the compounds on the market under the name of "Belt Dressing," are so injurious in their effects on leather belting, and we are so often asked to recommend something of the kind that we have put up in neat and convenient packages the waterproof dressing with which we have been treating our belts for several years. We know what this is, and can recommend it to all users of leather belting. It will add to the life of any belt, and for belts which are used in damp or very hot places it is invaluable.

The cement is put up in an attractive manner, making desirable stock for the shelf.

THE SALEM NAIL COMPANY, O. Nelson, proprietor, find their facilities for doing business at their comparatively new location, 292 Pearl street, New York, much increased. They have been in this neighborhood for nearly 40 years, and have seen numerous changes in the Hardware trade. They are now carrying a full line of all kinds of Black, Galvanized and Tinned Copper, Yellow Metal and Zinc Nails, Tacks and Spikes; Black and Galvanized Rods; Galvanized Wire Fence Staples and Hardwood Fence Hooks of every description; also Slaters' Tools and Stanynough's Slate Puncher.

JOHN H. GRAHAM & Co., 113 Chambers street, New York, have been appointed selling agents for the line of Grass and Corn Hooks manufactured by G. & N. Nolin, Skowhegan, Me. These Hooks are of three grades, known as the Nolin Solid Steel, Concave and the Nolin Socket.

AN ERROR was made in the description of the J. G. C. covered steel spring hinge, published in our issue of the 10th inst. This hinge, manufactured by the Coleman Hardware Company, 59 Dearborn street, Chicago, is made in one size, $3\frac{1}{2} \times 3\frac{1}{2}$ inches, full size, and finished in Japan and copper bronze. It is also made in electro nickel, copper, brass and Japanese finish for special orders.

THE SWEATT MFG. COMPANY, of Minneapolis, Minn., manufacturers of the famous Barrel Tray Wheelbarrows, whose plant was on August 5th last entirely destroyed by fire, have resumed operations in their new quarters, with greatly enlarged facilities.

WM. T. WOOD & Co., Arlington, Mass., manufacturers of Ice Tools of every description, for the sale of which James A. Bogardus, 167 Chambers street, New York, is agent, have recently issued their fifty-eighth annual catalogue. It is a pamphlet of 48 pages, the covers and illustrations being printed in color. In their announcement reference is made to the high grade of material used and by the employment of skillful workmen, who have been in their employ many years, a guarantee of the excellence of every article made by them is assured. As this concern have been making this line of goods more than half a century, the list is too well known to require enumeration here. It would seem that everything needed for properly cutting, storing and handling ice has been provided. At the end of the book a telegraph code is given, which will enable

buyers with hurry orders to communicate them quickly at minimum expense.

ON SUNDAY NIGHT, November 13, Winston, N. C., was the scene of the most disastrous conflagration in its history, there being really two distinct fires. The first nearly destroyed an entire square, while the second, the result, it is supposed, of sparks from the first, completely destroyed a square, largely composed of wooden buildings, three blocks away. The fire was discovered about midnight in the basement of Brown's drug store, adjoining the First National Bank, in which was located the Hardware store of S. E. Allen, the largest in that business in Winston, being the second calamity of such a character suffered by Mr. Allen within two years. The roof, third and second floors of the bank building were destroyed, and what was not burned was thoroughly saturated with water from the engines, supplemented by torrents of rain the following night. Mr. Allen's books, papers and much valuable stock was removed—in a damaged condition, however. He was fairly well covered by insurance, but with liberal and favorable adjustment must suffer a heavy loss—not, however, so great as on a former occasion. There being no suitable building obtainable, he is unable to say how soon he will be able to resume, and has instructed his New York buyers, R. K. Carter & Co., to cancel unfilled orders and arrange for the return of all goods in transit.

IN OUR ISSUE of November 17 reference to an export order for Lamps made by the Plume & Atwood Mfg. Company, to go to Calcutta, India, was made to read 8 instead of 80 dozen, the correct quantity.

THE PIQUA HANDLE & MFG. COMPANY, Piqua, Ohio, in their Lock Furniture department, although operating it less than a year, have found their facilities for producing these goods entirely inadequate, and are making preparations to materially increase the productive capacity in this direction by the addition of new machinery, &c.

THE NATIONAL METAL EDGE BOX COMPANY, Philadelphia, are preparing a large exhibit for the World's Fair, where they will have an entire box plant in active operation. The company report their business as very brisk. Hardwaremen are stated to be very generally adopting their system of Boxes as the standard for packing heavy goods.

WATROUS & MCCARTHY, Tracy, Conn., are putting on the market an adjustable safety ice shoe, an illustration of which is shown in their advertisement in another column. The manufacturers state that they were unable to supply the demand last season, but with an increased output they expect to be able to fill orders promptly hereafter.

SHEPARD HARDWARE COMPANY, Buffalo, N. Y., are erecting an addition to their plant in the shape of a building 30 x 80 feet, which is designed for jannanning purposes. They have also recently extended their foundry floor, and advise us that they now use about two acres of floor space for foundry purposes.

GIDDENS & BROWN are the new Hardware firm which recently commenced business at Marianna, Ark., and not Glidden & Brown, as mentioned in *The Iron Age* several weeks ago.

THE LUFKIN RULE COMPANY, Saginaw, Mich., advise us that they will be pleased to send on approval samples of their Reliable Steel Measuring Tapes, a description of which appeared in last week's *Iron Age*, to any one desiring them.

THE MCINTOSH-HUNTINGTON COMPANY, Cleveland, Ohio, issue an interesting cir-

cular, containing a large number of replies received from customers in reply to their circular letter in regard to sale of Wire Nails in their towns in comparison with the demand for Cut Nails. The replies indicate that the Hardware men who have responded find it necessary to carry both Wire and Cut Nails in stock, but are generally of the opinion that the Wire Nail has come to stay and that it is growing in popularity.

COBURN TROLLEY TRACK MFG. COMPANY, Holyoke, Mass., have just closed contracts with the Illinois Central Railroad to furnish 600 box cars with their Coburn Car Door Hangers. They have also engaged to furnish hangers for 1000 cars for the New York, Lake Erie & Western Railroad, and 300 cars for the Southern Iron Car Line.

OWING TO SOME CHANGES which they contemplate making, Miller & Van Winkle have concluded to give up their New York office at 102 Walker street, and have moved the office over to their works in Brooklyn, where they can give their undivided attention to business. The address of the firm in Brooklyn is 18 to 24 Bridge street and 80 to 88 John street.

THE W. BINGHAM COMPANY, Cleveland, Ohio, have decided to open a department for the sale of Bicycles, and Sundries. They have made contracts with two Bicycle factories, one making a strictly high-grade wheel of finest design and finish and the other making an excellent medium-grade wheel, and will control the entire output of both plants. The company will be entirely unrestricted as to territory, and it is their intention to cover the entire country as thoroughly as possible, planting agencies at every advantageous point. They have secured the services of P. E. Seas, who will have the management of this new department and will devote his entire time to it. A new catalogue, entirely devoted to Cycles and Cycle Sundries, is now being compiled and will be ready for distribution in a week or two.

JACOB BROMBACHER'S SONS have removed from the first loft of 20 Cliff street, where they have had their salesroom for the last 15 years, to the larger and more convenient quarters comprised in the store floor and basement of 30 Cliff street. The basement they have fitted up with the most modern machinery (including a 30 horse-power Edison Motor) as a first-class blacksmith, grinding and machine shop, where they will be in position to make, beside their regular line of goods, all kinds of special machinery for cutting and working Sheet Metals, Card and Strawboards, Leathers, Felts and Textile Fabrics generally. Besides making new goods they will be in position to do any repairing requiring high class forging, grinding or machine work, such as the repairing of Dies, grinding of Scoring and Milling Machine Cutters and also of Snips, Shears and Knives up to any length not exceeding 12 feet. Having power in sample room also, they are in position to show Power Presses, Shears and Corrugating Machinery, &c., in operation, and will make arrangements with manufacturers to exhibit their machinery.

Exports.

THE FOLLOWING are the exports of Hardware, Metals, Machinery and related goods from the port of New York for the week ending November 12, 1899. It will be observed that they are misleading in regard to Mexico, as most of the goods for that country are shipped by rail:

ANTWERP.		Quantity.		Value.			
India Rubber Goods, cases.....	13			\$3,344		Firearms, case.....	1 18
Electrical Material, cases.....	5			859		Cotton Lines, bale.....	1 54
Sewing Machines, cases.....	80			930		BRAZIL.	
Sandpaper, bundles.....	15			138		Wheels and Axles, case.....	1 306
Razor Strops, case.....	1			14		Firearms, cases.....	5 1,494
Agricultural Implements, pkg.....	1			14		Plated Ware, cases.....	7 864
Manufactured Wood, packages.....	6			19		Electrical Material, cases.....	53 1,612
Manufactured Iron, packages.....	4			93		Nails, kegs.....	225 451
Emery, case.....	1			3		Pumps, package.....	1 39
Cartridges, cases.....	6			287		Twine, bales.....	24 560
Hardware, cases.....	105			1,915		Ice-Cream Freezers, cases.....	5 147
Zinc, barrels.....	1			10		Woodware, packages.....	2 13
Machinery, packages.....	11			694		Manufactured Wood, cases.....	10 19
Wagons, box.....	1			60		Lamp Goods, packages.....	6 232
Plated Ware, cases.....	2			287		Typewriters, case.....	1 10
Whetstones, case.....	1			2		Bird Cages, cases.....	3 86
Pumps, package.....	1			10		Bicycles, case.....	1 58
C. Sweepers, case.....	1			10		Clocks, packages.....	46 1,076
Belting, case.....	1			15		Tacks, cases.....	38 227
ABERDEEN.						Sandpaper, bales.....	5 113
Manufactured Iron, packages.....	17			366		Crucibles, hogsheads.....	3 120
ADEN.						Trays, cases.....	8 146
Carriages, packages.....	4			215		Tin Sheets, cases.....	4 75
AMSTERDAM.						Cotton Lines, case.....	1 50
Manufactured Iron, packages.....	56			840		Buggies, cases.....	6 166
Sewing Machines, cases.....	200			4,424		Manufactured Steel, case.....	1 25
Clocks, cases.....	2			50		Hardware, packages.....	558 5,162
Woodware, packages.....	2			7		Manufactured Iron, packages.....	38 567
Pumps, packages.....	10			356		Sewing Machines, cases.....	18 282
Plated Ware, case.....	1			55		Cartridges, cases.....	39 1,107
Grindstones.....	15			60		Trunk Material, packages.....	31 638
Hardware, cases.....	32			336		Cutlery, cases.....	101 1,034
Emery, keg.....	1			7		Manufactured Copper, case.....	1 24
C. Sweepers, case.....	1			14		Scales, cases.....	19 348
Firearms, cases.....	2			144		Percussion Caps, case.....	1 100
Manufactured Wood, package.....	1			4		India Rubber Goods, cases.....	6 264
Ice-Cream Freezers, case.....	1			6		Candlesticks, cases.....	2 115
Trunks, packages.....	4			20		Agricultural Implements, pkgs.....	45 708
AVILES.						Tricycles, cases.....	2 84
Electrical Material, cases.....	4			170		Ironware, cases.....	4 94
BELFAST.						Machinery, case.....	1 45
Machinery, package.....	1			125		Fuse, barrels.....	6 115
Sewing Machines, cases.....	13			493		Tinware, case.....	1 14
BERLIN.						BRITISH POSSESSIONS IN AFRICA.	
India Rubber Goods, cases.....	11			734		Sash Cord, box.....	1 16
Woodware, packages.....	8			700		Hardware, cases.....	821 7,483
Hardware, case.....	1			60		Woodware, packages.....	125 1,667
BRITISH EAST INDIES.						Firearms, cases.....	3 119
Sheet Iron, packages.....	6			570		Cartridge, cases.....	21 427
Scales, cases.....	7			168		Manufactured Iron, packages.....	640 2,418
Carriages.....	6			447		Cart.....	1 75
Boiler Comp., kegs.....	30			436		Carriage Material, packages.....	222 3,550
Lamp Goods, packages.....	6			112		Twine, bale.....	1 29
Hardware, cases.....	3			45		Cutlery, cases.....	31 305
BOLIVIA.						Machinery, packages.....	191 10,971
Hardware, cases.....	6			60		Sash Weights, boxes.....	21 65
Carriage Material, cases.....	2			28		Manufactured Wood, packages.....	5,282 16,147
Carriages.....	2			780		Agricultural Implements, pkgs.....	792 11,221
Scale.....	1			75		Nails, kegs.....	801 1,785
BARCELONA.						Windmills, packages.....	6 101
Crucibles, hogsheads.....	3			75		Scales, cases.....	4 21
BRUSSELS.						Saws, cases.....	3 40
Manufactured Iron, packages.....	35			1,154		Pumps, packages.....	15 431
Ice Cream Freezers, cases.....	3			45		Lamp Goods, packages.....	13 370
Hardware, cases.....	18			320		Clocks, cases.....	4 275
BRITISH WEST INDIES.						Store Trucks, cases.....	2 50
Hardware, packages.....	58			627		BRITISH HONDURAS.	
Manufactured Iron, packages.....	133			621		Hardware, packages.....	10 91
Lamp Goods, packages.....	30			202		Manufactured Iron, packages.....	24 115
Carriage Materials, packages.....	18			203		Sewing Machines, cases.....	18 205
Woodware, packages.....	236			642		Tinware, cases.....	16 129
Electrical Material, packages.....	3			217		Cutlery, cases.....	3 67
Sewing Machines, cases.....	59			851		Candles, boxes.....	149 230
Cartridges, case.....	1			4		Cotton Lines, bales.....	2 54
Twine, bales.....	2			21		Store Truck.....	1 3
Nails, kegs.....	139			380		Twine, bales.....	2 16
Steel Sheets.....	19			19		Building Material, packages.....	54 303
India Rubber Goods, case.....	1			11		Caps, case.....	1 8
Roofing Materials, packages.....	5			30		Lamp Goods, packages.....	3 9
Trunks, packages.....	26			151		Scales, boxes.....	5 33
Surgical Instruments, case.....	1			16		India Rubber Goods, case.....	1 9
Machinery, packages.....	5			109		Tricycles, case.....	1 4
Carriages.....	12			1,200		Nails, kegs.....	35 101
Machinery, package.....	1			8		Woodware, packages.....	11 40
Carts.....	3			34		BRITISH AUSTRALIA.	
Manufactured Wood, packages.....	44			287		Manufactured Wood, packages.....	120 1,086
Z. Ornaments, cases.....	2			32		Lamp Goods, packages.....	192 2,174
Scales, packages.....	2			101		Bird Cages, cases.....	3 49
Plated Ware, packages.....	1			67		Wire Goods, case.....	1 15
Hose, packages.....	3			51		India Rubber Goods, cases.....	2 50
Refrigerators, cases.....	5			67		Cutlery, boxes.....	3 138
R. R. Cars.....	2			90		Gun Caps, cases.....	5 183
Plated Ware, case.....	1			38		Gun Tools, case.....	1 16
Pumps, package.....	1			20		Velocipedes, cases.....	4 70
Bicycles.....	2			105		Plated Ware, cases.....	13 598
Agricultural Implements, pkgs.....	6			25		Toilet Ware Stands, cases.....	2 15
Brushes, cases.....	2			28		Wringers, cases.....	7 88
Cutlery, case.....	1			5		Sewing Machines, cases.....	26 567
Clocks, packages.....	12			215		Cartridge shells, cases.....	3 102
						Woodware, packages.....	5 23
						Hardware, packages.....	233 5,104
						Gun Primers, case.....	1 85
						Manufactured Iron, packages.....	31 725
						Carriage Material, packages.....	296 1,739
						Agricultural Implements, pkgs.....	27 1,054
						Nails, boxes.....	9 166
						Cartridges, cases.....	71 962
						Firearms, cases.....	20 1,650
						Clocks, cases.....	86 1,170
						Crucibles, hogsheads.....	2 60

Typewriters, cases.....	3	187	I. R. Goods, bales.....	5	129	DUTCH GUIANA.	
Tinware, cases.....	9	304	Boiler Felting, bales.....	5	61	Roofing Slates.....	10,000 300
Axles, cases.....	6	172	Nails, kegs.....	5	35	Agricultural Implements, pkgs..	2 45
Needles, case.....	1	225	Valves, package.....	1	18	Tinware, case.....	1 6
Windmills, cases.....	6	143	R. R. Matl., packages.....	17	464	Trunks, nes(s).....	4 8
Pumps, cas(k).....	1	38	Iron Safes.....	3	373	Hardware, cases.....	5 35
Refrigerators, crates.....	3	36	Tinware, cases.....	5	57	Machinery, packages.....	56 1,980
BREMEN.			Twine, bale.....	1	23	Agateware, case.....	1 14
Hardware, cases.....	23	446	Solder, box.....	1	11	ECUADOR.	
Emery Wheels, barrels.....	5	465	Pumps, packages.....	4	52	Sewing Machines, cases.....	14 122
Metal, cases.....	6	84	Typewriters, case.....	1	42	Machinery, packages.....	2 35
Silver Ware, cases.....	2	6,100	R. R. Velocipedes, box.....	1	117	Cutlery, cases.....	2 151
BRISTOL.			Freezers, crate.....	1	16	Iron, pieces.....	520 195
Clocks, cases.....	24	906	Electrical Goods, cases.....	334	1,741	Pumps, packages.....	3 225
Zinc Ashes, packages.....	326	402	Crucibles, boxes.....	2	12	I. R. Goods, cases.....	4 107
Manufactured Wood, packages..	323	1,673	Engineers' Instruments, cases ..	24	4,517	Hardware, packages.....	5 205
Hardware, case.....	1	50	Firearms, cases.....	2	58	Manufactured Iron, packages.....	518 1,998
Spelter, slab.....	1	4	Scales, cases.....	1	24	Cartridges, case.....	1 27
BRITISH GUIANA.			Wheelbarrows, package.....	1	12	Carriage.....	1 70
Lamp Goods, packages.....	74	270	Carriage.....	1	145	FRENCH WEST INDIES.	
Manufactured Wood, packages.....	4	168	Pumps, case.....	1	9	Lamp Goods, packages.....	10 53
Carriage Material, packages.....	4	14	Saws, case.....	1	5	Carriage Material, cases.....	2 37
Cutlery, cases.....	18	236	Manufactured Iron, packages.....	635	2,218	FRANKFORT.	
Woodware, packages.....	25	80	Manufactured Copper, cases.....	3	309	Tacks, boxes.....	85 904
Wheels and Axles, pairs.....	13	260	Steel, bars.....	2	6	Machinery, packages.....	3 153
Electrical Material, cases.....	10	323	Machinery, packages.....	100	9,161	GLASGOW.	
Agricultural Implements, pkgs..	4	46	Zinc, packages.....	31	315	Clocks, packages.....	71 1,298
Manufactured Iron, packages.....	13	131	Woodware, packages.....	17	51	Machinery, packages.....	11 902
Scales, cases.....	2	16	Grindstones.....	60	25	Manufactured Wood, packages.....	170 519
Water Coolers, cases.....	3	14	Powder, pounds.....	200	52	Manufactured Iron, packages.....	2 48
Hardware, cases.....	24	327	Trunks.....	8	60	Trunks, package.....	1 25
CATANIA.			Brushes, case.....	2	9	Whetstones, cases.....	4 600
Firearms, cases.....	9	1,026	Cutlery, packages.....	53	1,208	Woodware, packages.....	35 70
Hardware, cases.....	5	54	Bridge Material, packages.....	143	3,634	Sewing Machines, cases.....	7 445
CONSTANCE.			Plated Ware, case.....	1	48	Lead, pigs.....	4,594 9,600
Hardware, cases.....	3	128	Wringers, box.....	1	4	Hardware, cases.....	5 229
COPENHAGEN.			Bicycle, case.....	1	14	Lamp Goods, packages.....	22 918
Agricultural Implements, pkgs..	17	565	Silverware, case.....	1	100	GENOA.	
Machinery, package.....	1	700	Sewing Machines, cases.....	3	50	Metal Goods, packages.....	10 198
CUBA.			CHILI.			Ice-Cream Freezers, cases.....	2 13
Manufactured Iron, packages.....	2,399	11,530	Plated Ware, cases.....	5	941	Hardware, packages.....	65 934
Lamp Goods, packages.....	87	956	Scales, cases.....	117	1,872	S. Copper, barrels.....	400 5,400
Railroad Cars.....	6	565	Hardware, cases.....	119	2,033	GLJON.	
Iron Tubes.....	320	478	Manufactured Iron, packages.....	434	1,521	Clocks, case.....	1 14
Cutlery, cases.....	130	2,069	Lamp Goods, packages.....	61	637	Hardware, case.....	1 1
Twine, bales.....	6	125	Brushes, case.....	1	36	Machinery, packages.....	5 504
Sugar Cars.....	108	2,484	Saws, cases.....	3	34	Cartridges, case.....	1 5
Iron Safes.....	3	385	Wheelbarrows, packages.....	8	25	GIBRALTAR.	
Railroad Switches.....	16	192	Trunks, packages.....	29	240	Hardware, cases.....	10 182
Pumps, cases.....	22	13,153	Grindstone Fixtures, cases ..	3	17	Britannia Ware, cases.....	2 81
Railroad Material, packages.....	2,017	16,592	Nails, cases.....	6	31	Tinware, case.....	1 6
Steel Rails, pieces.....	3,000	13,000	Steel, bundles.....	4	12	Firearms, cases.....	7 690
Wheels.....	501	275	Sewing Machines, cases.....	65	1,111	Clocks, cases.....	38 492
Iron Pipes, pieces.....	370	4,028	Electrical Material, cases.....	9	468	I. R. Goods, cases.....	3 135
Springs, boxes.....	2	95	I. R. Goods, cases.....	2	120	GOTTENBURG.	
Mag. Metal, boxes.....	36	410	Machinery, packages.....	65	19,304	Iron Roll.....	1 100
Velocipedes, cases.....	2	9	Agricultural Implements, pkgs..	657	7,562	HULL.	
Iron Sheets.....	50	75	Manufactured Wood, packages..	6	69	Manufactured Wood, package..	12 335
India Rubber, bale.....	1	26	Woodware, packages.....	36	111	Machinery, packages.....	82 8,249
Car Material, packages.....	57	2,160	Ice-Cream Freezers, cases.....	5	56	HONG KONG.	
Hose, bale.....	1	34	Firearms, cases.....	2	209	Clocks, packages.....	343 5,598
Plated Ware, cases.....	6	465	Cutlery, cases.....	3	65	Lamp Goods, packages.....	3 15
Trunk Material, packages.....	2	34	Cartridges, cases.....	6	130	Hardware, cases.....	2 70
Nails, cases.....	7	73	Nails, kegs.....	2,863	7,388	Agateware, case.....	1 40
Manufactured Steel, case.....	1	42	Brass Goods, case.....	1	13	Manufactured Iron, package.....	1 10
Emery Cloth, bales.....	2	76	Tinware, cases.....	6	133	Firearms, cases.....	12 1,100
Tinware, cases.....	6	57	Bird Cages, cases.....	4	35	Typewriters, packages.....	4 250
India Rubber Goods, cases.....	10	1,200	Carriage Material, packages....	187	975	Electric Material, cases.....	6 170
Hardware, packages.....	372	6,508	Needles, case.....	1	50	Sewing Machines, cases.....	7 97
Manufactured Wood, packages..	30	1,420	Cash Registers, cases.....	4	250	HAMBURG.	
Machinery, barrels.....	2	49	Wire Rope, coils.....	6	560	Firearms, cases.....	10 602
Machinery, packages.....	5,755	121,370	Sandpaper, cases.....	2	27	Machinery, packages.....	96 6,784
Hoops.....	4,900	158	CHINA.			Spelter, slabs.....	3,095 7,200
Tacks, cases.....	15	281	Hardware, cases.....	30	240	Sash Cord, bale.....	1 60
Electrical Material, cases.....	53	1,115	Woodware, packages.....	10	80	Hardware, packages.....	937 11,134
Wheels and Axles, pairs.....	70	1,797	Lamp Goods, packages.....	38	644	Carriage Matl., packages.....	19 375
Locomotives.....	2	20,750	Bird Cages, cases.....	2	120	Sewing Machines, cases.....	1,069 19,119
Steel Plates.....	12	90	Razor Strops, case.....	1	60	Copper, casks.....	91 14,150
Nails, kegs.....	31	68	Brass Goods, case.....	1	60	Agricultural Implements, pkgs..	17 196
Woodware, packages.....	32	1,484	Nails, kegs.....	250	499	Wringers, cases.....	54 986
Grindstones.....	572	374	Sewing Machines, cases.....	24	279	Manufactured Wood, packages..	328 1,055
Agricultural Implements, pkgs..	189	4,246	Scales, cases.....	6	92	Whetstones, case.....	1 28
Blower.....	1	250	Lamp Goods, packages.....	13	40	Britannia Ware, cases.....	2 300
Bridge Material, packages.....	260	5,300	Wire Cloth, case.....	1	60	Carpet Sweepers, cases.....	12 280
Sugar Wagons.....	250	3,250	DUTCH EAST INDIES.			Manufactured Iron, packages.....	25 124
Clocks, cases.....	3	125	Scales, cases.....	4	162	Shells, barrels.....	24 250
Iron Plates.....	2	218	DUBLIN.			I. R. Goods, cases.....	3 500
Iron Beams.....	17	785	Manufactured Wood, packages..	30	357	Tinware, case.....	1 5
Well Wheels, barrels.....	3	24	Hardware, cases.....	4	75	Clocks, packages.....	21 242
Tricycles, packages.....	4	25	DUTCH WEST INDIES.			Copper, bars.....	4 89
Scales, cases.....	2	21	Hardware, packages.....	6	55	Roast Nickel, casks.....	14 4,145
Brushes, case.....	1	7	Lamp Goods, packages.....	11	22	Ice-Cream Freezers, cases.....	7 102
Bellows.....	4	14	Trunks.....	34	75	Cutlery, case.....	1 30
Valves, packages.....	4	90	Iron Pipe, pieces.....	5	50	Scales, case.....	1 25
Manufactured Copper, cases.....	5	304	Hand Truck.....	1	5	Metal Goods, case.....	1 3
Wire Goods, cases.....	12	103	Nails, case.....	1	3	HAYTI.	
Saws, cases.....	2	140	Bicycles.....	10	42	Hardware, packages.....	57 374
CENTRAL AMERICA.			Tinware, cases.....	5	134	Manufactured Iron, packages.....	25 96
Hardware, packages.....	70	1,414	Brushes, case.....	1	2	Twine, bale.....	1 37
Manufactured Wood, packages..	20	46	Zinc, cask.....	1	23	Pumps, packages.....	2 100
Lamp Goods, packages.....	6	66	Twine, bale.....	1	13	Carriages.....	3 56
Agricultural Implements, pkgs..	19	215	Refrigerator.....	1	27		
Iron Bars.....	35	77	Woodware, packages.....	11	32		
Shot, sacks.....	5	32	Manufactured Copper, case.....	1	26		
Cartridges, cases.....	4	92	Cutlery, case.....	1	12		
Wheels and Axles, packages....	88	1,885	Plated Ware, case.....	5	79		
			Pumps, package.....	1	4		
			Sewing Machines, case.....	1	13		

The Law Steel Hod.

The Law Mfg. Company, 611 St. Clair street, Toledo, Ohio, are offering steel brick and mortar hods, of which three are illustrated herewith. The yokes, as shown



Fig. 1.—The Law Steel Mortar Hod.

in Fig. 2, are made of the best wrought iron, properly rolled and bent by machinery, making all of the same size and changeable to any other hod of the same

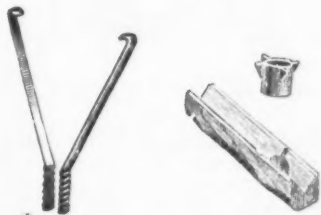


Fig. 2.—Yoke, Rest and Ferrule.

number. The rests are of wood, this being preferable to iron, as they are susceptible of being padded if so desired; but are designed to be left bare, as they are turned



Fig. 3.—Mortar Hod for Hoist.

and made to fit the shoulder. The handles are of hard wood, either of oak or ash, as giving the best service for the strength

required. They are 2 inches in diameter at the top, fitted with a malleable iron ferrule and nut combined to receive the threaded ends of the yokes. From the top the size gradually diminishes to 1 inch at the lower end. The hods are made in all sizes of the best cold rolled steel in one piece usually, No. 22 gauge, this number being found best suited to combine lightness and strength and durability, though some are made of No. 20 or even No. 18, for hoist machine work and stone masons, or bridge builders. The makers claim that the hods are light, strong and durable; that they never leak; that they are adjustable and always ready for use, and that one



Fig. 4.—Law Steel Brick Hod.

will outlast three wooden hods. The point is made by the makers that the steel mortar hod saves 25 pounds each way on every load, compared with a water-soaked wooden hod; so if the carrier makes 10 loads an hour, or 100 loads a day, it results in a saving of 5000 pounds of weight a day. Not only does it save this enormous weight, but it does not leak and scald the workman's shoulder. The hods can be knocked down and nested for shipping, and are suitable for the hardware trade to handle.

Semi-Hammerless Double Shot Gun.

American Arms Company, 36 New street, East Boston, Mass., are offering the trade a gun as herewith illustrated. The gun is made at present in 12 gauge only,



Semi-Hammerless Double Shot Gun.

with fine twist and Damascus barrels, rebounding locks, double bolt snap fore end, checked pistol grip and fore end, the stocks in all cases being imported. The gun is cocked by pressing down the little lever with the thumb of the hand holding the gun. The manufacturers state that this

gun has the distinctive features of their single semi hammerless gun, which has had a large sale.

Novelty Oil Heater.

In the accompanying illustration we present a general view of an oil heating stove which has just been placed upon the



Novelty Oil Heater.

market by Silver & Co., 54-58 Warren street, New York City. The top and base castings are of neat design attractively nickel-plated and giving to the stove a tasteful appearance. The sheet-iron drum is perforated in such a way that the rays of light can stream out into the room, giving a bright and cheerful effect. It is adapted for use in parlors, sitting rooms, offices, bathrooms, sleeping rooms, &c., and wherever a great amount of heat is not required. The stove is made in one size only and stands 20 inches in height. The base contains the oil tank with a capacity of 2 quarts, the construction

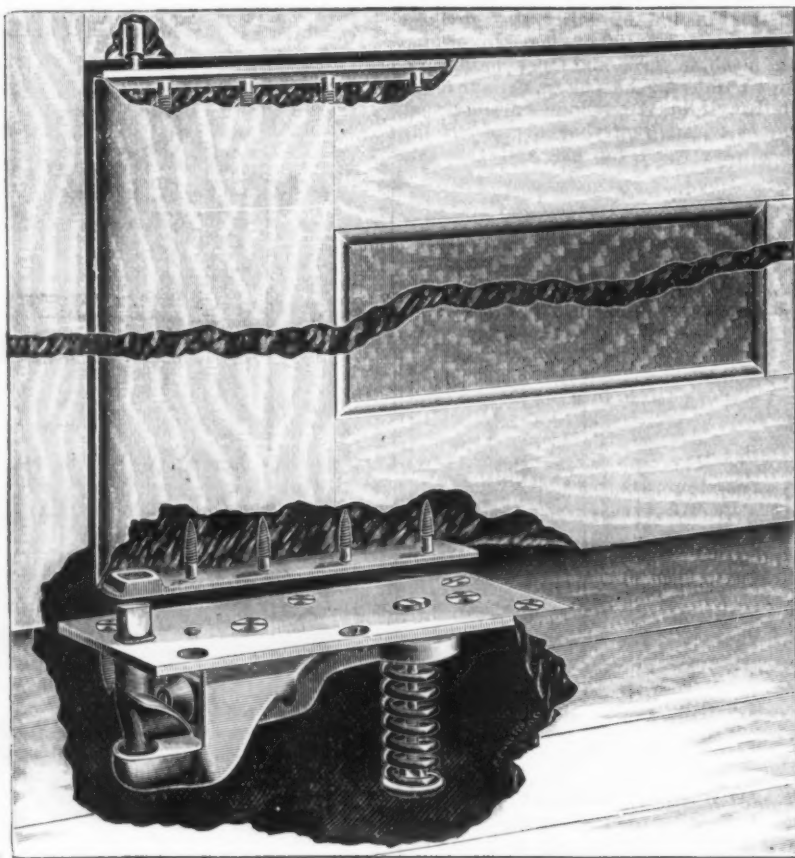
being such that the cold air circulation prevents the burning or heating of the floor or carpet beneath the stove. The manufacturers state that after the burner is lighted no further attention is necessary and that there is no escape of odor or smoke.

Stearns' Noiseless Floor Hinge.

E. C. Stearns & Co., Syracuse, N. Y., are putting on the market a floor hinge, as illustrated herewith.

The operating mechanism is attached to a plate which is let flush into the floor or

quently does not become heated and destroyed. The on and off pulls are decidedly different, so that it is easy to tell, even in the dark, whether the gas valve is open or closed. The manufacturers add that the movements in this burner are simple and positive, and that there are no ratchets and complicated springs to get



Stearns' Noiseless Floor Hinge.

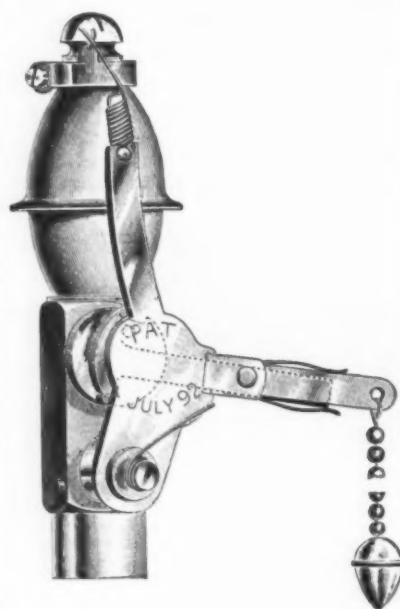
sill beneath the door, the working parts being concealed. The plate which attaches to the bottom of the door is malleable iron and rests on the cam which operates the door. A steel plate fastens to the top of the door and enters a brass thimble driven into the upper casing, forming a solid, noiseless and durable bearing.

The tension of the spring which governs the closing speed of the door is controlled by a regulating screw which is adjustable from the surface.

The spring is of heavy tempered steel wire, working by compression, thus avoiding the concentration of strain to any one point of the spring and reducing to a minimum the liability of breakage. All wearing parts are of steel, and it is stated that the door may be readily taken down without removing any part of the hinge.

Electric Gas Lighters.

The accompanying illustration shows the Iona safety pendant burner made by the Redding Electric Company of 41 Federal street, Boston, Mass. It is an electric gas lighter recently patented, and will be of interest to many of our readers. In the safety pendant burner there is but one contact made in lighting and extinguishing the gas. The result is accomplished by the wipe spring passing over the electrode and making connection on the return from the lighting pull, thus leaving time for the gas to flow through the tip; and on the off pull, by an ingenious arrangement of the valve cam, the electrode is not touched at all. In this burner it is pointed out the wipe spring does not at any time enter the gas flame, and conse-



The Iona Safety Pendant Burner.

actly the same as in the ordinary gas lighting burner, and so attached, furthermore, that there is no danger of straining the most delicate fixture. The valves of these burners are hand ground, and are said to be always perfectly tight.

Murphy Chest Weights.

Narragansett Machine Company, Providence, R. I., are offering chest weights as shown in Figs. 1 and 2. A swivel block

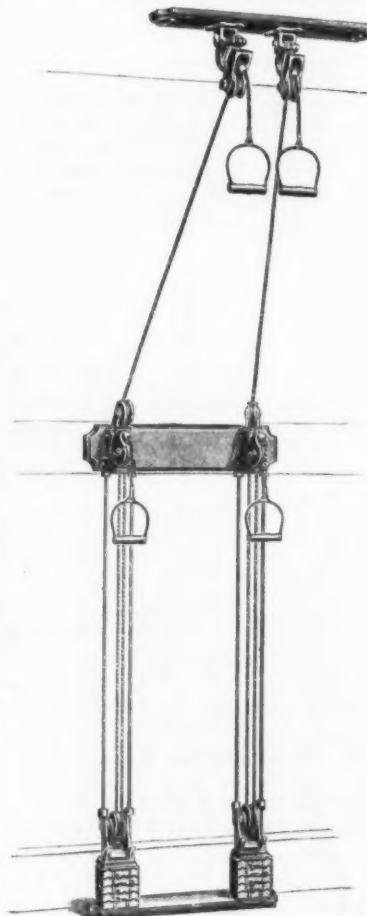


Fig. 1.—Murphy Intercostal Chest Weight.

has been designed specially for these machines, having a hollow pivot to make it compact. The guide pulley on top is adjustable on an arc to admit of varying positions of the overhead pulley. The

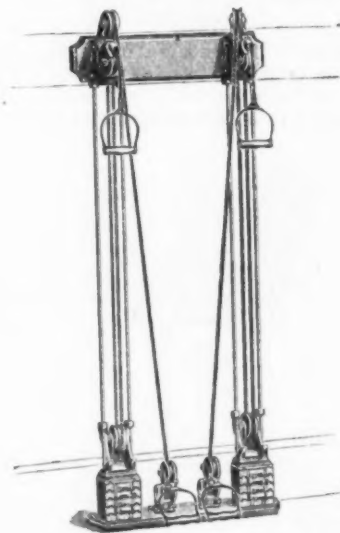


Fig. 2.—Murphy Back and Loins Chest Weight.

rods screw into the bracket so as not to work loose; at the same time the fastenings at the foot plate allow for unevenness of the floor. Buffers are provided at the top of the rods to prevent the weight holder striking the iron bracket. This feature is referred to as peculiar to this

line of chest weights, as deadening the noise resulting from the careless use of the machine, and by softening the blow prevents the weight holder breaking the bracket. It is claimed that the construction of the chest weights doubles the capacity of every machine, making class exercises on pulley weights on an extended scale possible. The weights have the under-lift weight holder, enabling the operator to change the weight without letting go the handles. The intercostal machine, Fig. 1, as the name indicates, acts directly on the muscles attached to and lying between the ribs, and may be used in a room or under a gallery 8 feet high. The machine shown in Fig. 2 is designed to develop the muscles of the back and loins. The manufacturers suggest that gymnastic apparatus for home use could be handled by the hardware trade to advantage, as there is a growing demand for this line of goods.

The Rothacker & Schultze Padlock.

Rothacker & Schultze, Philadelphia, Pa., are introducing a lock with keys, as shown in the accompanying cuts. Referring to improvements in locks, the makers

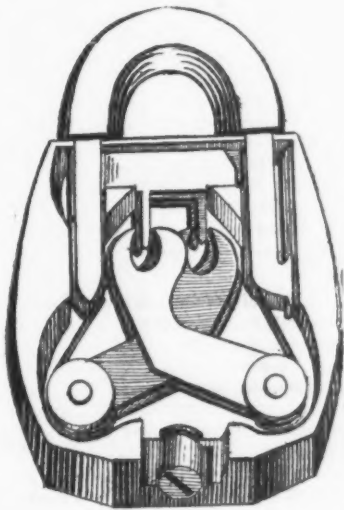


Fig. 1.—The Rothacker & Schultze Padlock.

remark that improvements have in a degree been confined to alterations of the interior mechanism, while the evident importance of preventing easy access to the



Fig. 2.—Keys for the Rothacker & Schultze Lock.

inner part of the lock with anything except the proper key through the key hole has received but little attention by inventors. These locks are made in four styles; with straight push key; twisted key, movable escutcheon and key guide; twisted key, movable escutcheon and tumbler protection; and twisted key, movable escutcheon and key trap, warranted proof against

being picked. The manufacturers claim that the simple construction of these locks is combined with superior safety.

Japanese Lawn Sprinkler.

Ette & Henger Mfg. Company, St. Louis, Mo., are offering the trade this sprinkler, as shown in Fig. 1. The



Fig. 1.—Japanese Lawn Sprinkler.

sprinkler has no revolving parts, the spray being regulated by a cup and disk, and is adjustable so that the spray may be regulated according to the pressure of water supplied. The manufacturers claim that the cup and disk will pass all gritty substances easily and freely, thus avoiding any clogging; that from any pressure a spray may be obtained as light as steam or the mist of Niagara, or as heavy as the area of the supply pipe; that it is particularly adapted for high or varying pressures, and that it will give satisfaction with a

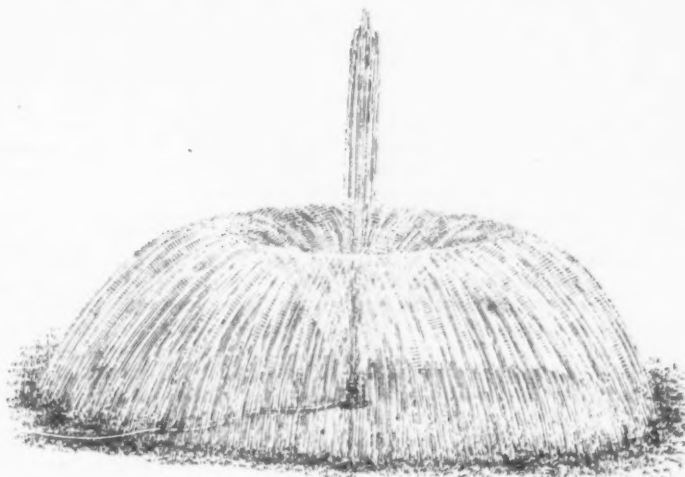


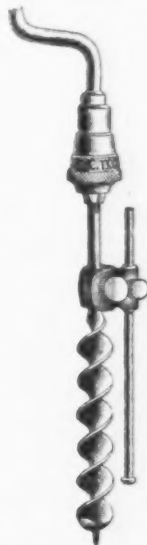
Fig. 2.—Spray of the Japanese Sprinkler.

low pressure. The frame of the sprinkler is so designed that it can be moved about

sired depth; and it is attachable to various kinds or makes of bits. It is nicely japanned and polished.

The Tatum Bit Gauge.

The Samuel C. Tatum Company, Water, John and Front streets, Cincinnati, Ohio, are putting on the market the bit gauge



The Tatum Bit Gauge.

shown in the accompanying illustration. It is designed as a depth gauge and can easily be adjusted to bore holes to any de-

Wire Glass.

The old adage which warns tenants of "glass houses" to abstain from stone throwing is in a fair way to relegation to the limbo of "wise saws" which have had their day and are no longer in touch with the times. Probably to the next generation it will be superfluous advice, should "wire glass" obtain the widespread adoption which is anticipated for it; for this new substance, which is about to be placed on the market, will, from all accounts, withstand not merely stones, but much more penetrative missiles; and stone throwers who may be inhabitants of a house constructed of such glass will be able to rest secure from the effects of retaliation in kind. Wire glass, the material in question, is now being produced in this country in commercial quantities. The process of its manufacture is the invention of Frank Schuman of Tacony, Philadelphia, who has secured a number of patents in connection with it. A com-

the lawn without turning off the water. Fig. 3 gives an idea of the form and spread of the spray.

Following the example of Fall River, the cotton manufacturers at Providence and Lowell have advanced the scale of wages.

pany has been formed, under the name of the American Wire Glass Company, to carry out the manufacture of the material on a large scale. Hitherto the production has been limited and of a somewhat experimental nature, although several tons of wire glass have been turned out from the temporary works. The process has now been brought to complete perfection and the material is being produced in some quantity, though as yet inadequate to the demand. Extensive works are, however, being rapidly pushed to completion at Tacony, near Philadelphia, which will afford a daily capacity of 5000 square feet of glass. It is expected that they will be ready for occupation by February.

The idea of making a strong combination of wire and glass is said to have had its inception some years ago in England, but it never seems to have gone beyond the region of experiment, although some small panes, not more than 1 foot square, of an imperfect kind, were made, but the material never obtained recognition as an article of commerce on account of the great cost of production and limitation in the size of the sheets. It remained for an American to carry out the idea to a practical issue. Frank Schuman, after patient and exhaustive experiments, has overcome the initial difficulties and is now able to make sheets of wire glass by a process of his own, of any desired size or thickness and of perfect consistency, at a cost which will bring it within the reach of all who now use ordinary glass. The invention has gained the enthusiastic approval of numerous scientific and practical men—architects, engineers, builders and others who have seen and tested the product which can be adapted to an infinite variety of uses.

Wire glass is composed of a sheet of glass of any quality having imbedded in its substance—sandwiched as it were—a meshwork of wire gauze or netting, which renders the material so tough and cohesive as to withstand all ordinary shocks, and which, if cracked or even badly broken or bent, still remains intact, leaving the pane almost as useful as a protection from the weather or a medium for the transmission of light as it was when uninjured.

The process of manufacture as conducted at Tacony is briefly as follows: The melted glass is poured out upon a rolling table, with edges regulating its width and thickness. Over the table a carriage moves, consisting of three hollow rollers, the first of which rolls out the glass smoothly. Following upon it is a carrier containing a sheet of red-hot wire gauze, which is seized and carried under roller No. 2, which lays it out on the surface of the still hot and semi-fluid glass. This roller is corrugated and presses the wire in wave-like folds into the mass; while the third roller, a smooth one, follows after, filling up the ruts and smoothing the sheet, leaving the wire in the center hermetically protected from the air. The system of corrugating the wire mesh is found to answer far better than if laid flat, as it binds the glass and makes a more homogeneous substance. Red hot iron cores are inserted in the hollow rolls to give them the necessary degree of heat. The glass is annealed for 40 hours, and is then ready for use.

A few of the uses to which the new material can be more specially adapted may be mentioned. For large glass-roofed buildings, such as train sheds, its advantages are obvious. The strength of wire glass being several times greater than that of the ordinary material under similar conditions, it will be more durable and capable of withstanding the shocks and jars incidental to its position much better. The use of wire glass in roofs will also obviate the danger to life and limb which is always present where ordinary glass is so

placed as to be liable to fall on passers-by when broken. To remove this risk train sheds are usually provided with copper wire netting under the skylights. But this material soon corrodes under the action of the gases from locomotive smoke stacks, and has to be renewed at least once a year. By the use of wire glass this expense and labor are eliminated and a considerable saving effected; while the wire inserted in the glass costs but 2 cents per pound and need never be renewed. The panes can be easily kept clean, which is not the case with the system now in vogue. The wire glass covered roof, too, will be proof against hailstones and other missiles; while it will be impossible for a man to fall through the glass, and even if cracked, the pane will shed the water as effectually as before. We learn that the Pennsylvania Railroad Company, recognizing its merits, have placed an order for 200,000 feet of this glass for use on the roof of the new train shed at the Broad Street Station, Philadelphia, while specifications have been asked for wire glass for the new St. Louis Terminal Depot. It is calculated that, once fixed, this material—which costs little more than common glass, with the addition of about 2 cents a pound, the value of the wire—will last as long as the roof itself.

For use, too, in windows of machine and other work shops, rolling mills and factories, the same qualities recommend it for adoption, for it is practically unbreakable by any ordinary means. It would be an efficient protection in turbulent neighborhoods and during strikes, for even if pierced by a crowbar no opening of a size larger than the mesh of the wire net could be effected, while stones would have absolutely no effect in breaking a window so fitted. By means of larger panes, too, more light could be admitted than is practicable with the usual moderate-sized window pane now used in factory buildings.

Another important point is the application of the new material to shipbuilders' purposes, for sky and port lights and ships' glass work generally. Its strength and toughness will enable it to successfully resist the enormous impact of ocean waves, particularly in port lights and bull's eyes, which can also be made larger than has heretofore been possible. Skylights made of wire glass will not need any of the unsightly and light-impeding protections now used on board ship. Its qualities also render it suitable for use in war vessels, on account of being unaffected by the concussion caused by the firing of heavy guns, so fruitful a source of destruction to ships' glass at present. Its merits have been so far recognized by the Government officials of this country that wire glass has been ordered for all the United States war vessels now building at Cramp's shipyard in Philadelphia.

The material is also adapted for pavement lights and other positions where great weight-bearing and light-transmitting properties are desired, as it is claimed to be able to sustain as much weight as a cast-iron plate of similar thickness, its superior elasticity rendering it less liable to fracture. Many other uses might be mentioned to which the new substance is adaptable, but enough has been said to show that the invention possesses a marked value and importance. Experiments with bullets, stones and other missiles have been carried out against wire glass panes with results in respect to its property of resistance which are said to be most remarkable.

But perhaps one of the most important points of merit lies in the fact that the substance is capable of withstanding an extraordinary degree of heat. We are told that experiments have proved it to form a better fire-proof partition than a wrought iron one of the same thickness. Under

stress of heat the glass will crack, and then melt so that the cracks are filled up and all air excluded; and it will adhere to the wire core and form an effective screen after the iron sheet above mentioned has been destroyed by the fierce temperature.

Sheets of wire glass can be made of any dimensions up to 40 x 20 feet, of any thickness and with wire of any gauge or size of mesh required.

We cannot but think that Mr. Schuman's invention "fills"—to use a stereotyped phrase—"a long-felt want;" and that this material will, if it can be produced as cheaply as is anticipated—soon obtain very widespread adoption in the departments to which we have referred above, as well as in many other instances to which want of space prevents our alluding. The officers of the American Wire Glass Company, are Thomas M. Hammett, president; H. C. Forrest, vice-president; and Frank Schuman, secretary and treasurer.

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NOVEMBER 23, 1892.

The character @ is used to indicate a range of price; thus discount 50&10@.50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

• *Adelphiops. Burchardi.*

See also Crayons

Halters—

Covert's Rope, Jute.....	60¢10¢10¢10¢
Covert's Rope, 7-10 in. Jute.....	70¢2¢
Covert's Rope, 1/2 in. Hemp.....	50¢2¢
Covert's Adj. Rope Halters.....	40¢2¢
Covert's Hemp Horse and Cattle Tie.....	50¢2¢
Covert's Jute Horse Ties.....	70¢2¢
Covert's Jute Cattle Ties.....	70¢2¢
Covert's Adj. Web Halters.....	35¢5¢2¢
Covert's Saddlery Works Halters.....	33¢
Covert's Saddlery Works Horse and Cattle Ties.....	33¢4¢

Handled Hammers—

Maydole's, list Dec. 1, '85.....	25¢10¢85¢
Buffalo Hammer Co.....	50¢10¢
Humason & Beckley.....	50¢10¢
Atha Tool Co.....	50¢10¢
Verrill.....	40¢10¢
C. Hammond & Son.....	40¢10¢
Fayette R. Plumb.....	40¢10¢
Artisans' Choice, A. E. Nail.....	40¢10¢
Regular Y. & P. A. E. Nail.....	50¢
Horsehoe Turning Hammers.....	30¢
Other Hammers.....	40¢10¢
Cheney's Claw.....	40¢10¢
Cheney's Machinist's & Riveting.....	50¢5¢
Hartford, Nail Hammers.....	40¢10¢
Hartford, Machinists, &c.....	50¢5¢50¢10¢
Magnetic Tack, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100.....	1.75
Nelson Tool Works.....	40¢10¢
Warner & Nobles, new list.....	25¢10¢
Peck, Stow & Wilcox.....	40¢10¢50¢
Sargent's.....	40¢10¢10¢

Heavy Hammers and Sledges—

3 lb and under.....	75¢10¢75¢10¢
3 to 5 lb.....	75¢10¢75¢10¢
Over 5 lb.....	85¢
Wilkinson's Smiths.....	10¢4¢11¢7¢

Handcuffs and Leg Irons—

See Police Goods.

Handles—**Cross-Cut Saw Handles—**

Atkins' No. 1 Loop, 28¢; No. 3, 18¢; No. 6, 15¢; No. 2 and No. 4, Reversible, 18¢.	
Champion.....	15¢

Iron, Wrought or Cast—

Door or Thumb.....	
Nos. 0 1 2 3 4	
Per doz.....	90¢1.00 1.08 1.35 1.50

Wood—

Saw and Plane.....	40¢10¢50¢
Hammer, Hatchet, Axe, &c.....	40¢10¢50¢
Brad Axl.....	40¢10¢50¢
Hickory Firmer Chisel, ass'd.....	40¢10¢50¢
Hickory Firmer Chisel, large.....	40¢10¢50¢
Apple Firmer Chisel, ass'd.....	40¢10¢50¢
Apple Firmer Chisel, large.....	40¢10¢50¢
Socket Firmer Chisel, ass'd.....	40¢10¢50¢
Socket Framing Chisel, ass'd.....	40¢10¢50¢
J. B. Smith & Co.'s Pat. File.....	50¢
File, assorted.....	40¢10¢50¢
Auger, assorted.....	40¢10¢50¢
Auger, large.....	40¢10¢50¢
Pat. Auger, Ives.....	50¢10¢
Pat. Auger, Douglas.....	50¢10¢
Pat. Auger, Swan.....	50¢10¢
Hoe, Rake, Shovel, &c.....	60¢60¢5¢

Hangers—

Barn Door, old patterns.....	60¢10¢10¢70¢
Barn Door, New England.....	60¢10¢10¢70¢
Samson Steel Anti-Friction.....	55¢
Orleans Steel.....	55¢
Hamilton Wrought Steel Track.....	55¢
U. S. Wood Track.....	55¢
Champion.....	60¢10¢
Rider and Wooster, Medina Mfg. Co.'s list.....	70¢
Climax Anti-Friction.....	55¢
Climax Anti-Friction for Wood Track.....	55¢
Zenith for Wood Track.....	55¢
Reed's Steel Arm.....	50¢
Challenge, Barn Door.....	50¢
Sterling.....	50¢50¢10¢
Victor, No. 1, \$15.00; No. 2, \$16.50.....	50¢
Cheritree.....	50¢10¢
Kidder's.....	40¢10¢50¢
Boss.....	60¢10¢
Best Anti-Friction.....	60¢10¢
Duplex (Wood Track).....	60¢10¢5¢
Terry's Pat., 7 doz pr. 4 in., \$10.00; 5 in., \$12.00.....	50¢10¢
Terry's Steel Anti-Friction Leader.....	50¢10¢
Terry's Steel Anti-Friction Ideal.....	50¢10¢
Cronk's Patent, Steel Covered.....	50¢5¢
Wood Track Iron Clad, 7 ft. 10¢.....	50¢
Carrier Steel Anti-Friction.....	50¢10¢
Architect, 7 set \$6.00.....	30¢
Eclipse.....	30¢10¢
Felix, 7 set \$4.50.....	20¢
Richards.....	30¢30¢10¢
Lane's New Standard.....	50¢50¢5¢
Lane's Standard.....	50¢50¢50¢10¢
Lane's Parlor.....	40¢
Ball Bearing Door Hanger.....	20¢10¢20¢10¢10¢
Warner's Pat.....	20¢10¢20¢10¢10¢
Stearns' Anti-Friction.....	20¢10¢20¢10¢10¢
Stearns' Challenge.....	25¢10¢25¢10¢10¢
Faultless.....	40¢40¢5¢
American, per set \$6.00.....	20¢10¢
Rider & Wooster, No. 1, 62¢; No. 2, 75¢.....	40¢
Paragon, Nos. 1, 2 and 3.....	25¢10¢
Cincinnati.....	25¢10¢
Paragon, Nos. 5, 54, 7 and 8.....	20¢10¢
Crecent.....	60¢60¢10¢
Nickel, Cast Iron.....	50¢
Nickel, Malleable Iron and Steel.....	40¢
Seranton Anti-Friction Single Strap.....	40¢
Wild West, 4 in. Wheel, \$15.00; 5 in. Wheel, \$21.00.....	45¢
Star.....	40¢10¢40¢10¢5¢
May.....	50¢50¢50¢10¢
Barry.....	40¢10¢
Interstate.....	40¢
Magie.....	50¢
Pendulum, Payson.....	40¢
Moody.....	45¢

Harness Snaps—See Snaps.**Hatchets—**

American Axe and Tool Co.	
Blood's.....	40 & 10
Hunt's.....	50¢5¢
Hurd's.....	
Mann's.....	
Peck's.....	
Underhill's.....	
Buffalo Hammer Co.....	
Fayette R. Plumb.....	
C. Hammond & Son.....	
Kelly's.....	
Sargent's & Co.....	
Ten Eyck Edge Tool Co.....	
Collins.....	10¢
Schulte, Lohoff & Co.....	50¢50¢5¢

Hay and Straw Knives—

See Knives.

Hinges—**Blind Hinges—**

Parker.....	75&2¢
Huffer.....	50¢
Clark's, Nos. 1, 3, 5, 40 and 50.....	80&5¢
Clark's Mortise Gravity.....	50¢
Sargent's, Nos. 1, 3, 5, 11, 12, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 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2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855, 2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881, 2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907, 2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933, 2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959, 2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985, 2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011, 3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037, 3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063, 3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089, 3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115, 3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141, 3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167, 3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193, 3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219, 3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245, 3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271, 3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297, 3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323, 3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349, 3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375, 3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401, 3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427, 3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453, 3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479, 3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 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3837, 3839, 3841, 3843, 3845, 3847, 3849, 3851, 3853, 3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869, 3871, 3873, 3875, 3877, 3879, 3881, 3883, 3885, 3887, 3889, 3891, 3893, 3895, 3897, 3899, 3901, 3903, 3905, 3907, 3909, 3911, 3913, 3915, 3917, 3919, 3921, 3923, 3925, 3927, 3929, 3931, 3933, 3935, 3937, 3939, 3941, 3943, 3945, 3947, 3949, 3951, 3953, 3955, 3957, 3959, 3961, 3963, 3965, 3967, 3969, 3971, 3973, 3975, 3977, 3979, 3981, 3983, 3985, 3987, 3989, 3991, 3993, 3995, 3997, 3999, 4001, 4003, 4005, 4007, 4009, 4011, 4013, 4015, 4017, 4019, 4021, 4023, 4025, 4027, 4029, 4031, 4033, 4035, 4037, 4039, 4041, 4043, 4045, 4047, 4049, 4051, 4053, 4055, 4057, 4059, 4061, 4063, 4065, 4067, 4069, 4071, 4073, 4075, 4077, 4079, 4081, 4083, 4085, 4087, 4089, 4091, 4093, 4095, 4097, 4099, 4101, 4103, 4105, 4107, 4109, 4111, 4113, 4115, 4117, 4119, 4121, 4123, 4125, 4127, 4129, 4131, 4133, 4135, 4137, 4139, 4141, 4143, 4145, 4147, 4149, 4151, 4153, 4155, 4157, 4159, 4161, 4163, 4165, 4167, 4169, 4171, 4173, 4175, 4177, 4179, 4181, 4183, 4185, 4187, 4189, 4191, 4193, 4195, 4197, 4199, 4201, 4203, 4205, 4207, 4209, 4211, 4213, 4215, 4217, 4219, 4221, 4223, 4225, 4227, 4229, 4231, 4233, 4235, 4237, 4239, 4241, 4243, 4245, 4247, 4249, 4251, 4253, 4255, 4257, 4259, 4261, 4263, 4265, 4267, 4269, 4271, 4273, 4	

Brittan, Graham & Mathes, list Jan. 1890, 60¢10¢10¢
 Perkins' Burglar Proof, 33¢25¢
 Plate, 33¢25¢
 Barnes Mfg. Co., 40¢40¢10¢
 Yale, net prices
 Deltz Flat Key, 30¢
 L. & C. Round Key Latches, 30¢10¢
 L. & C. Flat Key Latches, 30¢10¢
 Romer's Night Latches, 15¢
 Brooklyn Latches, 35¢
 Shephardson or U. S., 35¢
 Seed's N. Y. Hasp Lock, 25¢

Padlocks—

List June 10, 1891, 50¢25¢
 Norwich Lock Mfg. Co., old list, 70¢25¢
 Yale Lock Mfg. Co., net prices
 Eagle, 40¢
 Eureka, Eagle Lock Co., 40¢25¢
 Romer's, Nos. 0 to 91, 30¢
 Romer's Scandinavian, &c., Nos. 100 to 605, 30¢
 A. E. Deltz, 40¢
 Champlain Padlocks, 40¢
 Hotchkiss, 30¢
 Star, 60¢
 Horseshoe, 40¢
 Barnes Mfg. Co., 40¢40¢10¢
 Nock's, 40¢40¢10¢
 Brown's Pat., 25¢
 Scandinavian, 90¢4¢
 E. F. Frain's Keystone Scandinavian, Nos. 119, 120, 130 and 140, 90¢10¢
 Other Nos., 65¢
 Ames Sword Co. up to No. 150, 40¢
 Ames Sword Co. above No. 150, 50¢
 Slaymaker, Barry & Co., 85¢5¢
 No. 1010 line, 45¢10¢
 No. 61 line, 50¢5¢
 No. 21 line, 75¢

Sash, &c.—

Clark's No. 1, \$10; No. 2, \$8 ½ gr., 33¢4¢
 Ferguson's, 33¢4¢
 Victor, 60¢10¢25¢
 Walker's, 10¢
 Attwell Mfg. Co., 25¢33¢4¢
 Heading, 60¢10¢60¢10¢10¢
 Hammond's Window Springs, 40¢
 Common Sense, Jap'd, Cop'd and Br'ed, 40¢
 Common Sense, Nickel Plated, 40¢
 Universal, 30¢
 Kempshall's Gravity, 60¢
 Corbin's Daisy, list Feb. 15, 1886, 70¢
 Payson's Perfect, 60¢10¢
 Huginn's Sash Balances, 25¢5¢2¢
 Huginn's New Sash Locks, 25¢5¢2¢
 Stoddard's "Practical", 10¢
 Ives' Patent, 60¢10¢60¢10¢25¢
 Fish (Liesche's pat.), No. 100, 85¢
 No. 106, 7 gr., 10¢
 Davis, Bronze, Barnes Mfg. Co., 40¢
 Champion Safety, list January, 1889, 70¢
 Security, 70¢
 Giant, list Jan., 1889, 70¢5¢
 Wolcott's, 60¢10¢5¢
 Monarch, 50¢

Lumber Tools—

See Tools, Lumber.

Lustro—

Four-ounce bottles, 40¢ doz, \$1.75; ½ gross, \$17.00

Machines.

Boring—

Without Augers, Upright, Angular, 50¢
 Douglas, 50¢
 Snell's, Rice's Pat., 5.50 6.75 40¢10¢10¢
 Jennings', 5.50 6.75 45¢45¢10¢
 Other Machines, 2.35 2.75
 Phillips' Patent with Auger, 7.00 7.50
 Miller's Falls, 7.50 25¢

Fluting—

Knox, 4½-inch Rolls, \$3.25 each 35¢
 Eagle, 3½-inch Rolls, \$3.00 each 35¢
 Eagle, 5½-inch Rolls, \$2.85 35¢
 Crown, 4½ in., \$3.50; 6 in., \$4.00; 8 in., \$4.50 each 35¢
 Crown Jewel, 6 in., \$3.50 each 35¢
 American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each 35¢
 Domestic Fluter, 60¢ch, \$1.50
 Geneva Hand Fluter, White Metal, 40¢
 Crown Hand Fluter, Nos. 1, \$15.00; 2, \$12.50; 3, \$10.00, 30¢
 Shepard Hand Fluter, No. 85, per doz \$15.00, 40¢
 Shepard Hand Fluter, No. 110, 40¢
 Shepard Hand Fluter No. 95, 40¢
 Clark's Hand Fluter, 40¢
 Combined Fluter and Sad Iron, 35¢
 Buffalo, 40¢ doz \$10.00, 10¢

Hoisting—

Moore's Hand Hoist, with Lock Brake, 20¢
 Moore's Differential Pulley Block, 40¢
 Energy's Mfg. Co.'s, 25¢
 Sure Grip Steel Tackle Blocks, 25¢

Washing—

Anthony Wayne, 40¢ doz, No. 1, \$51; No. 2, \$45; No. 3, \$42
 Western Star, 40¢ doz, No. 2, \$45; No. 3, \$48
 Weissell, 40¢ doz \$54.00
 Fair and Square, 40¢ doz \$42.00

Mallets—

Hickory, 30¢10¢20¢10¢10¢
 Lignumvitae, 30¢10¢20¢10¢10¢
 B. & L. Block Co., Hickory & L., 30¢30¢10¢

Mattocks—Regular list,

60¢10¢60¢10¢5¢

Measures—

standard Fiberglass, No. 1, peek 4 dozen, \$4; ½-peek, \$3.50.

Meat Cutters—

See Cutters, Meat.

Menders, Harness—

Per doz, \$2.00

Mills—

Coffee—

Box and Side, list Jan. 1, 1888, 60¢40¢10¢
 Net prices are often made which are lower than above discount.
 American, Enterprise Mfg. Co., 30¢10¢30¢
 The Swift, Lane Bros., 30¢

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Philadelphia, 60¢10¢
 Pennsylvania and Continental, 60¢
 New Model and Excelsior, 60¢60¢10¢
 Other Machines, 60¢10¢10¢75¢

Muzzles—

Safety, 40¢ doz, \$3.00, 25¢

Nails—

Cut and Wire. See Trade Report.
 Wire Nails, Papered.
 Association list, May 1, 192, 80¢10¢10¢5¢
 Tack Mfrs.' list, 70¢5¢70¢10¢
 Wire Nails, Standard Penny.
 Card, Apr. 11, 192 base, \$1.90¢\$1.85

Horse—

Nos. 6 7 8 9 10
 American, 84¢ 84¢ 84¢ 84¢ 84¢
 Ausable, 28¢ 20¢ 25¢ 24¢ 23¢
 Clinton, Fin., 19¢ 17¢ 16¢ 15¢ 14¢ 30¢10¢
 Essex, 28¢ 26¢ 25¢ 24¢ 23¢
 Lyra, 19¢ 17¢ 16¢ 15¢ 14¢ 40¢10¢
 Snowden, 19¢ 17¢ 16¢ 15¢ 14¢ 40¢10¢
 Vulcan, 23¢ 21¢ 20¢ 19¢ 18¢ 35¢
 Northwest'n, 23¢ 21¢ 20¢ 19¢ 18¢ 35¢
 A. C., 25¢ 23¢ 22¢ 21¢ 20¢ 25¢25¢5¢
 C. B. K., 25¢ 23¢ 22¢ 21¢ 20¢ 33¢33¢10¢
 Maud S., 25¢ 23¢ 22¢ 21¢ 20¢ 40¢10¢5¢
 Champlain, 28¢ 26¢ 25¢ 24¢ 23¢ 40¢5¢5¢2¢
 Saranac, 23¢ 21¢ 20¢ 19¢ 18¢ 40¢5¢
 Champion, 23¢ 21¢ 20¢ 19¢ 18¢ 10¢10¢10¢
 Capewell, 19¢ 18¢ 17¢ 16¢ 15¢ 30¢
 Anchor, 23¢ 21¢ 20¢ 19¢ 18¢ 35¢
 Western, 23¢ 21¢ 20¢ 19¢ 18¢ 50¢
 Empire Bronzed, 13¢14¢ 50¢

Picture—

Brass Head, Sargent's list, 60¢40¢10¢
 Brass Combustion list, 30¢10¢
 Porcelain Head, Sargent's list, 50¢10¢10¢
 Porcelain Head, Combination list, 40¢10¢
 Niles' Patent, 40¢

Nail Pullers—See Pullers, Nail.

Nail Sets—See Sets, Nail.

Nut Crackers—

See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Square, Hex.
 Hot Pressed, 5.40¢ 6.00¢ off list
 Cold Punched, 5.00¢ 5.10¢ off list
 In packages of 100 ½, add 1-10¢ ½, add ½¢ ½, net.

Oakum—

Best or Government, 40¢ 60¢74¢
 U. S. Navy, 40¢ 54¢66¢
 Navy, 40¢ 54¢66¢

Oilers—

Zinc and Tin, 65¢10¢70¢5¢
 Brass and Copper, 50¢10¢50¢10¢5¢
 Malleable, Hammer, No. 1, \$3.00; No. 2, \$4.00; No. 3, \$4.40 10¢5¢
 Malleable, Hammers' Old Pattern, same list, 45¢
 Prior's Pat. or "Paragon" Zinc, 60¢10¢10¢
 Prior's Pat. or "Paragon" Brass, 50¢
 Olmstead's Tin and Zinc, 60¢
 Olmstead's Brass and Copper, 50¢
 Broughton's Zinc, 60¢
 Broughton's Brass, 50¢
 Gem, P. D. & Co., 40¢
 Steel, Draper & Williams, 30¢

Openers, Can—

Messenger's Comet, 40¢ doz \$3.00, 25¢
 American, 40¢ gross \$2.75¢\$3.00
 Duplex, 40¢ doz 25¢, 15¢20¢
 Lyman's, 40¢ doz \$3.75, 20¢
 No. 4, French, 40¢ doz \$2.25, 55¢60¢
 No. 5, Iron Handle, 40¢ gr \$6.00, 45¢50¢
 Eureka, Hammer, 40¢ doz \$2.50, 10¢
 Sardine Scissors, 40¢ doz \$2.75, 30¢
 Star, 40¢ doz \$2.75, 30¢
 Sprague, No. 1, \$2.00; 2, \$2.25; 3, \$2.50, 60¢70¢
 Excelsior, No. 1 \$2.50; No. 2, \$1.50, 40¢
 World's Best, 40¢ gross, No. 1, \$12.00, No. 2, \$24.00; No. 3, \$36.00, 50¢10¢
 Universal, 40¢ doz \$3.00, 55¢5¢
 Domestic, 40¢ doz \$2.00, 45¢
 Champion, 40¢ doz \$2.00, 45¢

Packing, Steam—

Rubber—

Standard, 70¢70¢10¢
 Extra, 60¢60¢5¢
 N. Y. B. & P. Co., Standard, 60¢
 N. Y. B. & P. Co., Empire, 60¢
 N. Y. B. & P. Co., Salamander, 25¢
 Jenkins' Standard, 40¢ 80¢, 25¢25¢5¢

Miscellaneous—

American Packing, 10¢11¢ ½ ½
 Russia Packing, 14¢ ½
 Italian Packing, 15¢14¢ ½
 Cotton Packing, 15¢17¢ ½
 Jute, 7¢8¢ ½

Pails—

Galvanized—

Quarts 10 12 14
 Hill's Light Weight, 40¢ doz, \$2.75 3.00 3.25
 Hill's Heavy Weight, 40¢ doz, 3.00 3.25 3.75
 Helwig's, 2.50 2.75 3.00
 Sidney Shepard & Co., 2.50 2.75 3.00
 Iron Clad, 2.50 2.75 3.00
 Fire Buckets, 2.75 3.25 3.50
 Buckets—See Well Buckets.

Indurated Fiber Ware—25¢

Star Pails, 12 qt., 40¢ doz \$5.40
 Stable and Milk, 14 qt., 40¢ doz \$6.00
 Fire Pails, deep, 40¢ doz \$5.40
 Fire Pails, round bottom, 40¢ doz \$7.80

Standard Fiber Ware—

Plain, Deer'd
 Water Pails, 12 qt., 40¢ doz \$4.00 \$4.50
 Dairy Pails, 14 qt., 40¢ doz 4.50 5.00
 Fire Pails, No. 1, 12 qt., 40¢ doz 4.50 5.00
 Fire Pails, No. 2, 14 qt., 40¢ doz 5.00 5.50
 Sugar Pails, 6.00 6.50
 Horse Pails, 5.00
 Buggy Pails, 4.00
 Shop Jars (bat. trap), 8.00 9.00
 Chamber Pails, 14 qt., 6.50 7.50

Pans—

Dripping—

Small sizes, 40¢ doz \$4.4¢
 Large sizes, 40¢ doz \$5.4¢
 Silver & Co. (Covered), 40¢

Fry—

No. 0 1 2 3 4
 40¢ doz, \$3.00 \$3.75 \$4.25 4.75 \$5.25
 No. 5 6 7 8
 40¢ doz, \$6.00 \$7.00 \$8.00 \$9.00
 Polished, regular goods, 75¢70¢10¢
 Acme Fry Pans, 60¢5¢

Dust—

Steel Edge, No. 1, 40¢ doz \$1.75

Paper and Cloth—

Sand and Emery—

List April 19, 1886, 50¢10¢50¢10¢5¢
 Sibley's Emery and Crocus Cloth, 30¢

Parers—

Apple—

Advance, 40¢ doz \$4.75
 Baldwin, 40¢ doz 5.25
 Bonanza, each 5.00
 Daisy, 40¢ doz 4.00
 Dandy, each 7.50
 Eclipse, 40¢ doz 4.25
 Eureka, 1888, each 16.00
 Family Bay State, 40¢ doz 13.00
 Favorite, 40¢ doz 5.00
 Gold Medal, 40¢ doz 4.00
 Ideal, 40¢ doz 4.00
 Improved Bay State, 40¢ doz 27.00¢30.00
 Little Star, 40¢ doz 4.50
 Monarch, 40¢ doz 13.50
 New Lightning, 40¢ doz 5.50
 Oriole, 40¢ doz 4.00
 Penn, 40¢ doz 4.00
 Perfection, 40¢ doz 4.00
 Pomona, 40¢ doz 4.00
 Rocking Table, 40¢ doz 0.00
 Turn Table, 40¢ doz 4.50
 Victor, 40¢ doz 4.00
 Waver, 40¢ doz 4.00
 White Mountain, 40¢ doz 4.25
 72, 40¢ doz 4.25
 78, 40¢ doz 7.00

Potato—

White Mountain, 40¢ doz \$4.50
 Antrim Combination, 40¢ doz \$5.50
 Hoosier, 40¢ doz \$13.50
 Saratoga, 40¢ doz \$5.50

Pencils—

Faber's Carpenters', high list 50¢
 Faber's Round Gilt, 40¢ gr \$5.25
 Dixon's Lead, 40¢ gr \$4.50
 Dixon's Lumber, 40¢ gr \$6.75
 Dixon's Carpenters', 10¢

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00, 60¢10¢60¢10¢5¢

Picture Nails—

See Nails, Picture.

Pinking Irons—

See Irons, Pinking.

Pins—

Bow—

Humason, Beckley & Co.'s, 60¢10¢
 Sargent & Co.'s, \$17 and \$18, 60¢10¢
 Peck, Stow & W. Co., 50¢10¢50¢10¢5¢

Curtain—

Silvered Glass, net
 White Enamel, net

Escutcheon—

Iron, list Nov. 11, 1885, 50¢10¢50¢10¢5¢
 Brass, 60¢60¢5¢

Pipe, Wrought Iron—

List July 21, 1892.
 1½ and under, Plain, 57½¢5¢57½¢10¢
 1½ and under, Galv., 47½¢5¢47½¢10¢
 1½ and over, Plain, 67½¢5¢67½¢10¢
 1½ and over, Galv., 57½¢5¢57½¢10¢
 Boiler Tubes,
 Sizes up to 24 in., inclusive, 55¢57½¢
 Sizes 3 in. and larger, 57½¢62½¢
 Casing, 62½¢
 Inserted Joint Casing, 47½¢
 Steel Boiler Tubes, 27½¢
 Cold Drawn Seamless Steel Tubing, 50¢

Planes and Plane Irons—

Wood Planes—

Molding, 40¢10¢40¢10¢10¢10¢
 Bench, First quality, 50¢10¢
 Bench, Second quality, 55¢10¢
 Bailey's (Stanley R. & L. Co.), 50¢10¢

Iron Planes—

Bailey's (Stanley R. & L. Co.), 50¢10¢
 Miscellaneous Planes (Stanley R. & L. Co.), 25¢10¢
 Steers' Iron Planes, 40¢10¢
 Meriden Mal. Iron Co.'s, 40¢40¢10¢
 Davis' Iron Planes, 40¢40¢10¢
 Birmingham Plane Co., 50¢50¢10¢
 Gage Tool Co.'s Self-Setting, 20¢10¢10¢
 Chaplin's Iron Planes, 40¢40¢10¢
 Standard Tool Co., 50¢50¢5¢

Plane Irons—

Butcher's, 50¢10¢5¢25¢ to \$
 Buck Bros., 30¢
 Auburn Thistle, 30¢10¢
 Ohio, 30¢10¢
 Sandusky,
 L. & I. J. White, 25¢
 Stanley R. & L. Co., 50¢10¢

Plates—

Felice, 40¢ 60¢64¢

Pliers and Nippers—

Button's Patent, 60¢
 Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 40¢
 Humason & Beckley Mfg. Co., 50¢50¢10¢
 Lindsay's Giant, 33½¢
 Gas Pliers, Custar's Nickel Plated, 60¢
 Eureka Pliers and Nippers, 40¢
 Russell's Parallel, 25¢
 P. S. & W. Cast Steel, 50¢
 P. S. & W. Tinner's Cutting Nippers, add 6¢, 10¢
 Carew's Pat. Wire Cutters, 20¢
 Morrill's Parallel, 40¢, \$12.00, 50¢5¢
 Cronk's 5 in., \$15.00; 10 in., \$21.00, 50¢5¢
 Cronk's Button Pattern, 50¢10¢60¢
 Cronk's Carrier Pliers, 60¢60¢5¢

Plumbs and Levels—

Regular list, 75¢10¢75¢10¢5¢
 Stanley's Duplex, 20¢10¢
 Stanley's Handy, 20¢10¢
 Diction's, 70¢10¢70¢10¢10¢
 Pocket Levels, 30¢
 Davis Iron Levels, 30¢
 Davis' Inclinoimeters, 10¢10¢

Poachers, Egg—

Buffalo Steam Egg Poachers, 40¢ doz, No. 1, \$6.00; No. 2, \$9.00, 25¢
 Silver & Co., 6-Ring, 40¢ doz, \$4.00; 3-Ring, 40¢ doz, \$2.00

Pokes, Animal—

Bishop's L. X. L., 40¢ doz \$6.00
 Bishop's O. K., 40¢ doz \$5.25
 Bishop's Pioneer, 40¢ doz \$3.75
 Bishop's American, 40¢ doz \$2.75
 Eagle, Double Stale, 40¢ doz \$5.75
 Eagle, Single Stale, 40¢ doz \$3.75
 Buckeye, Single Stale, 40¢ doz \$2.75
 Bolding, 40¢ doz \$6.00

Police Goods—

R. I. Tool Co., Handcuffs, \$15.00 40¢ doz 10¢
 R. I. Tool Co., Leg Irons, \$25.00 40¢ doz 10¢
 Towler's, 25¢
 Daley's Improved Handcuffs, 2 Hands, Polished, 40¢, \$48.00; Nickle, \$57.00; 3 hands, Polished, 40¢, \$72.00; Nickle, \$84.00, 25¢
 J. P. Lovell's Police Goods, 25¢

Polish—

Metal—

Prestoline, 30¢
 Prestoline, 33½¢
 Gaston's Silver Compound, 33½¢

Stove—

Joseph Dixon's, 40¢ gr, \$6.00, 10¢
 Gem, 40¢ gr, \$4.50, 10¢
 Gold Medal, 40¢ gr, \$6.

Presses—**Fruit and Jelly—**

Enterprise Mfg. Co. 20¢ doz. 30¢
 Giant, No. 1. 1/4 doz. 30¢
 Shepard's Queen City. 40¢
 Silver & Co. 1/2 doz. 27¢

Pruning Hooks and Shears—See Shears.**Pullers, Nail—**

Scranton. 1/2 doz. \$18.00, 33¢
 Curtis Hammer. 1/2 doz. \$18.00, 10¢
 Giant, No. 2. 1/2 doz. \$15.00, 10¢
 Pelican. 1/2 doz. \$9.00, 25¢
 Ecilpae. Each, \$2.00, net
 Economv. 1/2 doz., \$6.00

Pulleys—

Hot House, Awning, &c. 60¢ doz. 70¢
 Japanned Screw. 60¢ doz. 70¢
 Japanned Side. 60¢ doz. 70¢
 Japanned Clothes Line. 60¢ doz. 70¢
 Empire Sash Pulley. 55¢ doz. 60¢
 Moore's Sash, Anti-Friction. 50¢
 Hay Fork, Solid Eye, 4 in. \$4.00, 8 in. \$4.50
 Hay Fork, "Anti-Friction," 5 in. solid, \$6.70
 Hay Fork, "F" Common and Patent Bushed. 20¢
 Hay Fork, Tarbox Pat. Iron. 20¢
 Hay Fork, Reed's Self-Lubricating. 60¢
 Shade Rack. 45¢
 Tackle Blocks—See Blocks.
 Moore's Anti-Friction 5 in. Wheel, 1/2 doz., \$12.00. 40¢

Pumps—

Cistern, Best Makers. 60¢ doz. 10¢
 Pitcher Spout, Best Makers. 67¢ doz. 70¢
 Pitcher Spout, Cheaper Q'ds. 75¢ doz. 10¢

Punches—

Saddler's or Drive, good. 1/2 doz., 60¢ doz. 5¢
 Bemis & Call Co.'s Cast Steel Drive, 50¢ doz. 5¢
 Bemis & Call Co.'s Springfield Socket. 50¢ doz. 5¢
 Spring, good quality. 1/2 doz., \$2.50, 2¢ doz. 15¢
 Spring, Leach's Pat. 15¢
 Bemis & Call Co.'s Spring and Check. 40¢
 Solid Timmers, F. S. & W. Co., 1/2 doz., \$1.44
 Timmers' Hollow Punches, F. S. & W. Co. 30¢ doz. 2¢
 Rice Hand Punches. 15¢
 Avery's Revolving. 40¢
 Avery's Sawset and Punch—See Sawsets.

Rail—

Sliding Door, Wrt Brass. 1/2 doz., 35¢, 40¢
 Sliding Door, Bronze Wrt Iron. 1/2 doz., 45¢
 Sliding Door, Iron, Painted. 1/2 doz., 45¢
 Barn Door, Light. In. 1/2 doz., 45¢
 Per 100 feet. \$2.00 2.50 3.10, 10¢
 B. D. for N. E. Hand. Small. Med. Large.
 Per 100 feet. \$3.15 2.70 3.25 Net
 Terry's Steel Rail. 1/2 doz., 45¢
 Victor Track Rail, 7¢ per foot. 50¢ doz. 2¢
 Carrier, double braced, Steel Rail, 1/2 foot. 40¢ doz. 4¢
 Moore's Wrought Iron. 25¢
 Moody Steel Rail, 1/2 ft., 6¢. 45¢

Rakes—

Cast Steel, Association Q'ds. 70¢ doz. 2¢
 Cast Steel, outside Q'ds. 70¢ doz. 2¢
 Malleable. 70¢ doz. 2¢
 Gibbs Lawn Rake. 1/2 doz., \$4.90
 Canton Lawn Rake. 1/2 doz., \$3.75
 Favorite Lawn Rake. 1/2 doz., \$4.25
 Oneida Lawn Rake. 1/2 doz., \$4.00
 Fort Madison Prize Bow Brace and Peersless. 60¢
 Fort Madison Steel Tooth Lawn Rake, \$6.00. 25¢

Razors—

J. R. Torrey Razor Co. 20¢
 Wostenholme and Butcher, \$10 to £10. 10¢
 Jordan's AAAI, new list. 10¢
 Jordan's Old Faithful, new list. Net
 Galvanic. 1/2 doz., \$15.00
 Electric Cutlery Co. Net
 Campbell Cutlery Co. Net

Razor Straps—

See Straps, Razor.

Rings and Ringers—**Bull Rings—**

Union Nut Co. 55¢
 Sargent's. 75¢ doz. 10¢
 Hotchkiss' low list. 30¢
 Humason, Beckley & Co.'s. 70¢ doz. 10¢
 Peck, Stow & W. Co.'s. 50¢ doz. 10¢
 Ellrich Hdw. Co., White Metal, low list. 50¢ doz. 10¢

Hog—

Top of the Hill Ringers. 1/2 doz. \$2.00
 Top of the Hill Ringers. 1/2 doz. \$1.25
 Hill's Improved Ringers. 1/2 doz. \$1.25
 Hill's Old Style Ringers. 1/2 doz. \$1.12 1/2
 Hill's Tongs. 1/2 doz. \$1.00
 Hill's Ringers. 1/2 doz. \$1.00
 Perfect Ringers. 1/2 doz. \$1.50
 Perfect Ringers. 1/2 doz. \$2.15 doz. 25¢
 Blair's Hog Ringers. 1/2 doz. \$1.00
 Blair's Hog Ringers. 1/2 doz. \$1.00
 Champion Ringers. 1/2 doz. \$2.25
 Brown's Ringers. 1/2 doz. \$2.00
 Brown's Ringers. 1/2 doz. \$1.15 doz. 15¢
 Electric Hog Ringers. 1/2 doz. \$1.50
 Electric Hog Ringers. 1/2 doz. \$2.00
 Major Ringers. 1/2 doz. \$1.25
 Major Ringers. 1/2 doz. \$2.00

Rivets and Burrs—

Iron, list Nov. 17, '87. 60¢ doz. 5¢
 Copper. 60¢ doz. 5¢
 Coppered Iron, Bettina Brand. 40¢

Rivet Sets—See Sets.**Rods—**

Stair, Brass. 25¢ doz. 30¢
 Stair, Black Walnut. 1/2 doz. 40¢

Rollers—

Barn Door, Sargent's list. 60¢ doz. 10¢
 Acme Moore's Anti-Friction. 55¢
 Acme Barn Door Roller. 70¢
 Thompson Mfg. Co.'s Lawn Rollers. 30¢

Rope—See Trade Report.

Manila, 7-16 in. diam. and larger. 12¢
 Manila, 1/4 and 5-16 in. 12¢
 Manila, Tarred Rope. 11¢
 Manila, Hay Rope. 12¢
 Sisal, 7-16 inch and larger. 10¢
 Sisal, 1/4 and 5-16 in. 10¢
 Sisal, Tarred Rope. 9¢
 Sisal, Medium Lath Yarn. 9¢
 New Zealand, 7-16 in. and larger. 8¢
 New Zealand, 1/4 and 5-16 in. 9¢
 New Zealand, Hay Rope. 8¢
 New Zealand, Tarred Rope. 8¢
 Note—Manufacturers' prices on above 1¢ less, f.o.b. factory—less 1 1/2¢ for cash.
 Cotton Rope. 13¢ doz. 16¢
 Jute Rope. 6¢ doz. 7¢

Wire—

List February, 1892.
 All kinds. 45¢

Rules—

Boxwood. 80¢ doz. 10¢
 Ivory. 50¢ doz. 10¢
 Starrett's Rules and Straight Edges, Steel. 25¢ doz. 10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.**Saws—The following prices are generally cut by jobbers.**

Disston's Circular. 45¢ doz. 5¢
 Disston's Cross Cut. 45¢ doz. 5¢
 Disston's Hand. 25¢
 Woodrough & McParlin.
 Hand, Panel and Rip. 30¢ doz. 5¢
 Narrow Champion Cross Cuts with Handles, 1/2 foot. 18¢ doz. 2¢
 Champion Thin Back Cross Cuts, 1/2 foot. 26¢ doz. 2¢
 Champion Extra Thin Back Cross Cuts, 1/2 foot. 29¢ doz. 2¢
 One Man Champion Cross Cuts, 1/2 foot. 37¢ doz. 4¢
 Wheeler, Madden & Clemons Mfg. Co.
 Hand, Panel and Rip. 35¢ doz. 5¢
 Narrow Champion Cross Cuts with Handles, 1/2 foot. 18¢ doz. 2¢
 Champion Thin Back Cross Cuts, 1/2 foot. 26¢ doz. 2¢
 Champion Extra Thin Back Cross Cuts, 1/2 foot. 29¢ doz. 2¢
 One Man Champion Cross Cuts, 1/2 foot. 37¢ doz. 4¢
 Atkins' Circular Shingle & Heading. 50¢
 Atkins' Silver Steel Diamond X Cuts. 1/2 foot 70¢
 Atkins' Special Steel Dexter X Cuts. 1/2 foot 50¢
 Atkins' Special Steel Diamond X Cuts. 1/2 foot 32¢
 Atkins' Champion and Electric Tooth X cuts. 1/2 foot 30¢
 Atkins' Hollow Back X Cuts. 1/2 foot 20¢
 Atkins' Mulay, Mill and Drag. 40¢
 Atkins' One-Man Saw, with handles. 1/2 foot 40¢
 Peace Circular and Mill. 45¢ doz. 5¢
 Peace Hand Panel and Rip. 25¢ doz. 5¢
 Peace Cross Cuts. 45¢ doz. 5¢
 Richardson's Circular and Mill. 45¢ doz. 5¢
 Richardson's X Cuts. 45¢ doz. 5¢
 Richardson's Hand, &c. 25¢ doz. 5¢
 C. E. Jennings & Co. Hand, Panel and Rip. 25¢ doz. 5¢

Hack Saws—

Griffin's, complete. 40¢ doz. 10¢
 Griffin's Hack Saw Blades. 40¢ doz. 10¢
 Star Hack Saws and Blades. 25¢
 Eureka and Crescent. 25¢

Scroll—

Lester, complete, \$10.00. 25¢
 Rogers, complete, \$4.00. 25¢
 Barnes' Builders' and Cab Makers' \$15.25. 35¢
 Barnes' Scroll Saw Blades. 35¢

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality. 1/2 doz. \$18.00 doz. \$19.00
 Hatch, Tea, No. 161. 1/2 doz. \$6.50 doz. \$7.00
 Union Platform, Plain. \$2.10 doz. 20¢
 Union Platform, Striped. \$2.40 doz. 25¢
 Chatillon's Grocers' Trip Scales. 50¢
 Chatillon's Favorite. 25¢
 Family Turnbills. 30¢ doz. 10¢
 Riehle Bros' Platform. 40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting. 45¢**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.) \$6.00. 30¢ doz. 10¢
 Box, 1 Handle. 1/2 doz. \$2.25 doz. \$2.50
 Box, 2 Hane. 1/2 doz. \$3.00 doz. \$3.25
 Defiance Box and Ship. 20¢ doz. 10¢
 Foot. 50¢ doz. 60¢
 Ship, Common. 1/2 doz. \$3.50 net
 Ship, R. I. Tool Co. 10¢

Screen Window and Door Frames—See Frames.**Screw Drivers—**

See Drivers, Screw.

Screws—**Bench and Hand—**

Bench, Iron. 55¢ doz. 5¢
 Bench, Wood, Beech. 1/2 doz. \$2.25
 Bench, Wood, Hickory. 1/2 doz. \$2.50
 Hand, Wood. 35¢ doz. 10¢
 Hand, Grand Rapids. 35¢
 Lag, Blunt Point, list Jan. 1, 1890. 75¢ doz. 10¢
 Coach and Lag, Gimlet Point, list Jan. 1, 1890. 75¢ doz. 10¢
 Bed. 25¢ doz. 5¢
 Hand Rail, Sargent's. 70¢ doz. 10¢
 Hand Rail, H. & F. Mfg. Co. 70¢ doz. 10¢
 Hand Rail, Am. Screw Co. 75¢
 Jack Screws, Millers Falls list. 50¢ doz. 10¢
 Jack Screws, P. S. & W. 35¢
 Jack Screws, Sargent. 70¢
 Jack Screws, Stearns. 40¢ doz. 10¢

Cork—

Humason & Beckley Mfg. Co. 40¢ doz. 50¢
 Williams'. 33¢ doz. 33¢
 Howe Bros. & Hulbert. 35¢

Machine—

Flat Head Iron. 65¢
 Round Head Iron. 60¢

Wood—

List January 1, 1891.
 Flat Head Iron. 70¢
 Round Head Iron. 65¢
 Flat Head Brass. 70¢
 Round Head Brass. 65¢
 Flat Head Bronze. 70¢
 Round Head, Bronze. 65¢
 Rogers' Drive Screws. 82¢ doz. 10¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Grain. 40¢ doz. 10¢

Grass. 40¢ doz. 10¢

Scythe Snaths—

See Snaths, Scythe.

Sets—

Atken's Sets, Awls and Tools.
 No. 20, 1/2 doz. \$10.00. 60¢ doz. 5¢
 Fray's Adj. Tool Hds., Nos. 1, 1 1/2; 2, 1 1/2; 3, 1 1/2; 4, 1 1/2. 45¢
 Millers Falls Adj. Tool Hds.
 Nos. 1, 1 1/2; 2, 1 1/2. 25¢
 Henry's Combination Haft. 1/2 doz. \$5.50
 Stanley's Excelsior.
 No. 1, 1/2 doz. No. 2, \$4.00; No. 3, \$5.50. 30¢ doz. 10¢
 Common Brad Sets.
 No. 42, \$10.50; No. 43, \$12.50. 70¢ doz. 10¢

Nail—

Square. 1/2 gr. \$4.00 doz. \$4.25
 Round. 1/2 gr. \$3.25
 Buck Bros. 27¢
 Cannon's Diamond Point. 1/2 gr. \$12.20

Rivet—

Regular list. 70¢

Saw—

Stillman's Genuine. 1/2 doz. \$5.00 doz. 7.75, 40¢ doz. 5¢
 Stillman's Pattern, Hand, 1/2 doz. \$3.25, 40¢ doz. 5¢
 Common Lever. 1/2 doz. \$2.00, 45¢ doz. 5¢
 Morrill's No. 1, \$15.00. 40¢ doz. 20¢
 No. 11, \$15.00. 40¢ doz. 10¢
 Nos. 3 and 4, \$18.00. 40¢ doz. 5¢
 No. 5, \$24.00. 40¢ doz. 5¢
 Leach's No. 0, \$8.00; 1, \$15.00; 2, \$20.00; 3, \$24.00. 20¢ doz. 10¢
 Nash's. 1/2 doz. \$5.50, 10¢
 Hammer, Hotchkiss. \$5.50, 10¢
 Hammer, Bemis & Call Co.'s new Pat. 30¢ doz. 5¢
 Bemis & Call Co.'s Lever and Spring Hammer. 30¢ doz. 5¢
 Bemis & Call Co.'s Plate. 12¢
 Aiken's Genuine. \$13.00, 50¢ doz. 10¢
 Aiken's Imitation. \$7.00, 55¢ doz. 5¢
 Hart's Pat. Lever. 20¢
 Disston's Star. 25¢
 Leopold. 40¢ doz. 10¢
 Aiken's Lever. 1/2 doz. No. 1, \$8.00
 Aiken's Criterion. 1/2 doz. No. 1, \$6.00
 Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00. 40¢ doz. 10¢
 Avery's Saw Set and Punch. 50¢
 Chieftain Co.'s Superior. 1/2 doz. \$7.00
 Chieftain Co.'s Royal. 1/2 doz. \$7.50
 Crescent. 1/2 doz. \$2.00, 40¢ doz. 10¢
 Lloyd's Acme. 1/2 doz. \$15.00, 40¢ doz. 10¢
 Taintor Positive. 1/2 doz. \$18.00, 50¢

Sharpeners, Knife—

Larkins'.
 Applewood Handles. 1/2 doz. \$6.00, 40¢
 Rosewood or Cocobola. 1/2 doz. \$9.00, 40¢

Shaves, Spoke—

Iron. 45¢
 Wood. 30¢
 Bailey's (Stanley R. & L. Co.). 40¢ doz. 10¢
 Stearns. 30¢ doz. 10¢
 Cincinnati. 25¢ doz. 10¢
 Goodell's. 1/2 doz. \$9.00. 25¢

Shears—

American (Cast) Iron. 75¢ doz. 10¢
 Barnard's Lamp Timmers. 1/2 doz. \$2.75
 Timmers. 20¢ doz. 10¢
 Seymour's, list Dec. 1881. 60¢ doz. 10¢
 Heinisch's, list Dec. 1881. 60¢ doz. 10¢
 Heinisch's Tailor's Shears. 35¢ doz. 10¢
 Cast Steel Timmers.
 First quality. 80¢ doz. 10¢
 Second quality. 80¢ doz. 10¢
 Acme Cast Shears. 10¢ doz. 10¢
 Diamond Cast Shears. 10¢
 Clipper. 10¢ doz. 10¢
 Victor Cast Shears. 75¢ doz. 10¢
 Howe Bros. & Hulbert, Solid Forged Steel. 40¢
 Chicago Drop Forge & F. Co., Solid Steel Forged. 60¢
 Davenport Cutlery Co. 60¢ doz. 10¢
 Claus Shear Co., Japanned. 70¢
 Claus Shear Co., Nickled, same list. 90¢
 Galvanic 3/4 to 9 in., 1/2 doz. \$1.00 1/2 inch Electric Cutlery Co. Net
 Campbell Cutlery Co., Jap'd. 75¢
 Nickel Plated. 65¢

Pruning Shears and Hooks

Disston's Combined Pruning Hook and Saw. 1/2 doz. \$18.00, 20¢ doz. 10¢
 Disston's Pruning Hook. 1/2 doz. \$12.00, 20¢ doz. 10¢
 E. S. Lee & Co.'s Pruning Tools. 40¢
 Pruning Shears, Henry's Pat. 1/2 doz. \$3.75 doz. \$4.00
 Henry's Pruning Shears. 1/2 doz. \$4.25, 40¢ doz. 10¢

Wheeler, M. & C. Co., Combination.

Dunlap's Saw and Chisel. 1/2 doz. \$3.50, 30¢
 J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25
 P. S. & W. Co. 60¢

Tinners', &c.—

Shears and Snips (P. S. & W.). 20¢ doz. 25¢
 Snips, J. Mallinson & Co. 33¢ doz. 10¢

Sheaves—**Sliding Door—**

M. W. Co., list July, 1888. 50¢ doz. 10¢
 R. & E., list Dec. 18, 1885. 55¢ doz. 20¢
 Corbin's list. 60¢ doz. 25¢
 Patent Roller. 60¢ doz. 25¢
 Patent Roller, Hatfield's. 75¢
 Russell's Anti-Friction, list Dec. 18, 1885. 60¢ doz. 25¢
 Moore's Anti-Friction. 50¢

Sliding Shutter—

R. & E., list Dec. 18, 1885. 60¢ doz. 10¢
 Sargent's list. 70¢
 Reading list. 60¢ doz. 10¢

Shells—

First quality 4, 8, 10 and 12 gauge. 25¢ doz. 10¢
 First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list). 20¢ doz. 25¢
 Prize. 40¢ doz. 25¢
 Star, Club, Rival and Climax Brands. 33¢ doz. 10¢
 Smokeless brand, 12, 10, 16 gauge. 33¢ doz. 10¢
 Trap brand, 12 and 10 gauge. 33¢ doz. 10¢
 Selbold's Comb. Shot Shells. 15¢ doz. 25¢
 Brass Shot Shells, list quality. 60¢ doz. 25¢
 Brass Shot Shells, Club, Rival, Climax. 65¢ doz. 25¢

Shells Loaded—

Standard List, July 10, 1890. 40¢ doz. 10¢
 40¢ doz. 10¢

Ship Tools—

L. & J. J. White. 20¢ doz. 10¢

Shoes, Horse, Mule, &c.—**Horse—**

Burden's, Perkins', Phoenix, Diamond State, Bryn Mawr, at factory. \$4.00
 Bryden's Frog Measure, at factory. \$5.00

Mule—

Add \$1 per keg to above prices.

Ox Wrought—

Ton lots. 1/2 doz. 10¢
 1000 lb lots. 1/2 doz. 10¢
 500 lb lots. 1/2 doz. 10¢

Shot—

Drop, up to R. 25-b bag.	Ton lots	Small lots
Drop, up to R. 25-b bag. 1.40	1.40	\$1.45
Drop, B and larger, 25-b bag. 1.65	1.65	1.70
Drop, B and larger, 5-b bag. 1.65	1.65	1.70
Buck and Chilled, 25-b bag. 1.65	1.65	1.70
Buck and Chilled, 5-b bag. 2.00	2.00	2.00
Dust Shot, 25-b bag. 45	45	45
Dust Shot, 5-b bag. 45	45	45

Shovels and Spades—

Ames' Shovels, Spades, &c., list Nov. 1, 1885. 20¢
 Note—Jobbers frequently give 7¢ extra on above.
 Griffith's Black Iron. 50¢ doz. 10¢
 Griffith's C. S. 60¢ doz. 10¢
 Griffith's Solid C. S. R. R. Goods. 20¢
 St. Louis Shovel Co. 20¢ doz. 7¢
 Hussey, Hines & Co. 15¢ doz. 25¢
 Hubbard & Co.

Snaps Harness &c.

Anchor (T. & S. Mfg. Co.)	65¢
Fitch's (Bristol)	50¢10¢
Hotchkiss	10¢
Andrews	50¢
Sargent's Patent Guarded	70¢10¢10¢
German, new list	40¢10¢
Covert	50¢10¢5¢2¢
Covert, New Patent	50¢10¢5¢2¢
Covert, New R. E.	60¢10¢5¢2¢
Covered Spring	60¢10¢10¢
Covert's Saddlery Works' Triumph	35¢5¢

Snaths, Scythe

List	50¢50¢5¢
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Soldering Irons

See Irons, Soldering.

Spittoons, Cuspidors, &c.**Standard Fiberware**

Cuspidors, 8½-inch, # doz., No. 5, 8; No. 5, 8, 9.

Spittoons, Daisy, 8-inch, No. 1, 4; 10 and 11 inch, 6.

Spoke Shaves

See Shaves, Spoke.

Spoke Trimmers

See Trimmers, Spoke.

Spoons and Forks

Tinned Iron

Basting, Cen. Stamp, Co.'s list, 70¢10¢

Solid Table and Tea, Cen. Stamp, Co.'s list, 70¢10¢

Buffalo, S. S. & Co., 33¢5¢2¢

Silver Plated

4 months or 5¢ cash 30 days:

Meriden Brit. Co., Rogers

Rogers & Bros.

Rogers & Bros.

Reed & Barton

Wm. Rogers Mfg. Co.

Simpson, Hall, Miller & Co.

Holmes & Edwards Silver Co.

L. Boardman & Son.

Miscellaneous

Holmes & Edwards Silver Co.

No. 87 Mexican Silver

No. 30 Silver Metal

No. 24 German Silver

No. 50 Nickel Silver

No. 40 Nickel Silver

Wm. Rogers Mfg. Co.

Rogers' Silver Metal

18% Rogers' German Silver

22% Rogers' Nickel Silver

German Silver

German Silver, Hall & Elton

Nickel Silver

Britannia

Boardman's Nickel Silver

Boardman's Britannia Spoons, case lots

Spring

Door

Torrey's Rod, 30 in.

Gray's, # gr.

Bee Rod, # gr.

Warner's No. 1, # doz.

Gen. (Coll), list April 19, 1888

Star (Coll), list April 19, 1888

Victor (Coll)

Champion (Coll)

Cowell's No. 1, # doz.

Rubber, complete, # doz.

Hercules

Carriage, Wagon, &c.

Elliptic, Concord, Platform and Half

Scroll

Cliff's Bolster Springs

Squares

Steel and Iron

Nickel-Plated

Try Square and T Bevels

Diston's Try Square and T Bevels

Winterbottom's Try and Miter

Starrett's Micrometer Caliper Squares

Avery's Flush Bevel Squares

Avery's Bevel Protractor

Squeezers

Fodder

Blair's

Blair's "Climax"

Lemon

Porcelain Lined, No. 1

Wood, No. 2

Wood, Common

Dunlap's Improved

Sammis

Jennings' Star

The Boss

Dean's, Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Standard Fiber Ware

See Ware, Standard Fiber.

Staples

Blind

Barbed, ½ in. and larger

Barbed, ¼ in.

Fence Staples, Galvanized

Fence Staples Plain

Steelyards

Stocks and Dies

Blacksmith's

Waterford Goods

Lightening Screw Plate

Reece's New Screw Plates

Reversible Ratchet

Gardner

Green River

Stops, Bench

Morrill's	# doz \$9, 50¢
Hotchkiss	# doz \$5, 10¢10¢10¢
Weston's, No. 1, #10; No. 2, #10, 25¢10¢5¢	
McGill's, # doz \$3	
Cincinnati	35¢10¢
Terrell's Nos. 1 and 2, # doz, \$3; No. 3, \$3.60	

Stone**Sythe Stones**

Pike Mfg. Co., list April, 1892	33¢5¢
Cleveland Stone Co., list Nov. 1892	33¢5¢

Oil Stones, &c.

Pike Mfg. Co.	
Hindustan No. 1, # doz	8¢
Sand Stone	40¢40¢
Turkey Oil Stone, 4 to 8 in.	10¢
Turkey Silps	\$2.00
Washita Stone, Extra	50¢
Washita Stone, No. 1	40¢
Washita Stone, No. 2	30¢
Washita Silps, Extra	80¢
Washita Silps, No. 1	70¢
Arkansas Stone, No. 1, 3 to 5 in.	\$2.80
Arkansas Stone, No. 1 ½ to 8 in.	\$3.50
Lake Superior	# doz 13¢
Lake Superior Silps	# doz 20¢

Stove Polish

See Polish, Stove.

Stretchers Carpet

Cast Steel, Polished	# doz \$2.2
Cast Iron, Steel Points	# doz 75¢80¢
Socket	# doz \$1.75
Bullard's	25¢25¢10¢

Strops, Razor

Genuine Emerson	60¢60¢5¢
Imitation	# doz \$2.00, 20¢10¢5¢
Torrey's	20¢
L. & J. White	20¢5¢
Albertson Mfg. Co.	25¢
Beatty's	30¢
Sandusky Tool Co.	30¢30¢5¢
Shaves Cincinnati Tool Co.	20¢

Stuffer or Fillers,**Sausage**

Miles' Challenge, # doz \$20	50¢50¢5¢
Perry	# doz, No. 1, \$15.00; No. 0, \$21.00
Draw Cut No. 4, each \$30.00	20¢
Enterprise Mfg. Co.	20¢10¢
Silver	40¢10¢

Sweepers, Carpet and Lawn**Carpet**

Rissell No. 5	# doz \$17.00
Rissell No. 8	# doz \$20.00
Rissell, Grand	# doz \$16.00
Standard	# doz \$24.00
Domestic	# doz \$21.00
Domestic, No. 2	# doz \$22.00
Grand Rapids	# doz \$24.00
Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00	
Magie	# doz \$15.00
Improved Parlor Queen	# doz \$27.00
Nickel	# doz \$24.00
Japanned	# doz \$22.00
Excelsior	# doz \$22.00
Garland	# doz \$18.00
Parlor Queen	# doz \$24.00
Housewife's Delight	# doz \$16.00
Queen	# doz \$18.00
Queen, with band	# doz \$18.00
King	# doz \$20.00
Weed, Improved	# doz \$18.00
Hub	# doz \$16.00
Cog-Wheel	# doz \$16.00
Ladies' Friend	# doz \$16.00
Ladies' Friend No. 2	# doz \$16.00
Advance	# doz \$18.00
Our Leader	# doz \$19.00
Triumph	# doz \$20.00
Goshen	# doz \$21.00
Supreme	# doz \$22.00
Easy	# doz \$22.00
Gilt Edge	# doz \$24.00
Acme	# doz \$26.00
Imperial	# doz \$26.00
Grand Republic	# doz \$30.00
Banner	# doz \$22.00
The Star	# doz \$21.00
Reliable	# doz \$22.00
The Rapid	# doz \$22.00
Our Own	# doz \$27.00
Model	# doz \$27.00

Lawn

Thompson Mfg. Co.

Tacks, Brads, &c.

List October 19, 1890. Old established straight weights. Short weight goods are sold at lower prices.

Carpet Tacks	
American, Blued	60¢5¢
American, Tin'd and Cop'd	70¢
Steel, Bright and Blued	60¢5¢
Steel, Tinned and Coppered	70¢
Swedes Iron, Blued	72¢5¢
Swedes Iron, Tinned	75¢
American Iron Tacks, Domestic	60¢5¢
Swedes Iron Tacks	60¢5¢
S. S., Blued	70¢
S. S., Tinned	70¢
Lanc., Blued	55¢
Lanc., Tinned	60¢
Crim and Lanc Tacks	62¢5¢
S. S., Tinned	60¢5¢
Lanc., Blued	55¢
Lanc., Tinned	60¢
Basket and Trimmers' Tacks	52¢5¢
S. S.	60¢
Hungarian Nails	60¢
Common and Patent Brads	55¢
Leathered Tacks	50¢
Brush Tacks, S. S.	60¢
Looking Glass Tacks, S. S.	35¢
Picture-Frame Points, S. S.	35¢
Finishing Nails	60¢
Trunk and Clout Nails	
Black	62¢5¢
Tinned or Coppered	60¢5¢
Basket Nails	60¢
Chair Nails	52¢5¢
Cigar Box Nails	25¢
Tin Capped Nails	60¢

Miscellaneous

Double Point	90¢90¢10¢
Wire Carpet Nails	50¢10¢
Plymouth Rock Steel Carpet Tacks	25¢

Wire Brads and Nails

Steel-Wire Brads, R. & E. Mfg. Co.'s list	50¢10¢
See also Nails, Wire.	

Tapes, Measuring

American	40¢40¢5¢
Spring	40¢
Chesterman's, Regular list	25¢30¢

Thermometers

Tin Case	80¢80¢10¢
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Thimble Skeins

See Skeins.

Ties, Bale-Steel

Standard Wire, list	50¢10¢5¢
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Tinners' Shears, &c

See Shears, Tinners' &c.

Tinware

Stamped, Japanned and Piced, list Jan 20, 1887

Tire Benders, Upsetters, &c.

See Benders and Upsetters, Tire.

Tools**Coopers'**

Bradley's	20¢
Barton's	20¢20¢5¢
L. & J. White	20¢5¢
Albertson Mfg. Co.	25¢
Beatty's	30¢
Sandusky Tool Co.	30¢30¢5¢
Shaves Cincinnati Tool Co.	20¢

Lumber

Ring Peavies, "Blue Line"	# doz \$20.00
Ring Peavies, Common	# doz \$18.00
Steel Socket Peavies	# doz \$21.00
Mail Iron Socket Peavies	# doz \$19.00
Cant Hooks, "Blue Line"	# doz \$16.00
Cant Hooks, Common Finish	# doz \$14.00
Cant Hooks, Mail Socket Clasp, "Blue Line" Finish	# doz \$16.00
Cant Hooks, Mail Socket Clasp, Common Finish	# doz \$14.00
Cant Hooks, Clip Clasp, "Blue Line" Finish	# doz \$14.00
Cant Hooks, Clip Clasp, Common Finish	# doz \$12.00
Hand Spikes	# doz 6 ft., \$15.00; 8 ft., \$20.00
Pike Poles, Pike & Hook	# doz 12 ft., \$15.00; 14 ft., \$12.50; 16 ft., \$14.50; 18 ft., \$17.50; 20 ft., \$21.50
Pike Poles, Pike only	# doz 12 ft., \$10.00; 14 ft., \$11.00; 16 ft., \$13.00; 18 ft., \$16.00; 20 ft., \$20.00
Pike Poles, not ironed	# doz 12 ft., \$8.00; 14 ft., \$7.00; 16 ft., \$9.00; 18 ft., \$12.00; 20 ft., \$16.00
Setting Posts	# doz 12 ft., \$14.00; 14 ft., \$15.00; 16 ft., \$17.00
Swamp Hooks	# doz \$18.00

Saw

Atkins' Perfection	# doz \$12.00
Atkins' Excelsior	# doz \$6.00
Atkins' Giant	# doz \$4.00

Tobacco Cutters

See Cutters, Tobacco.

Transom Lifters

See Lifters, Transom.

Traps**Game**

Newhouse	40¢40¢5¢
Onelida Patent	70¢10¢
Game, Blake's Patent	40¢10¢5¢

Mouse and Rat

Mouse Wood, Choker	# doz holes, 9¢10¢
Mouse, Round Wire	# doz \$1.50 10¢
Mouse, Cage Wire	# doz \$2.50 10¢
Mouse, Catch-em-alive	# doz \$2.50 15¢
Mouse, Bonanza	# doz 0.90¢1.00
Rat, Decoy	# gr \$10.00, 10¢
Ideal	# gr \$10.00
Cyclone	# gr \$5.25
Hotchkiss Metallic Mouse, 3-hole traps	# doz 75¢; in full cases, # doz \$0.05¢
Hotchkiss Imp. Rat Killer	# gr \$15.50
Hotchkiss New Rat Killer	# gr \$16.50
Schuyler's Rat Killer	# gro \$15.00

Triers

Butter and Cheese	25¢
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Trimmers, Spoke

Bonney's	# doz \$10.00, 50¢
Stearns	20¢10¢
Ives, No. 1, \$15.00; No. 2, \$12.00 # doz.	
Douglas	55¢10¢
Cincinnati	# doz \$0.00, 20¢

Trowels

Lothrop's Brick and Plastering

Reed's Brick and Plastering	15¢
Diston's Brk and Plastering	25¢25¢5¢
Peace's Plastering	25¢25¢5¢
Clement & Maynard's	20¢20¢5¢
Rose's Brick	15¢20¢
Brad's Brick	25¢
Worral's Brick and Plastering	20¢
Garden	70¢
Cleves' Angle Trowel	# gro. No. 1, \$3.00; No. 2, \$3.00; No. 3, \$15. net @ 10¢

Trucks, Warehouse, &c.

B. & L. Block Co.'s list

Thompson Mfg. Co.

Tubes, Boiler

See Pipe.

Twine**Flax Twine**

No. 9, ¼ and ½ # Balls.....	25¢ 31¢
No. 12, ¼ and ½ # Balls.....	22¢ 30¢
No. 18, ¼ and ½ # Balls.....	20¢ 29¢
No. 24, ¼ and ½ # Balls.....	20¢ 29¢
No. 30, ¼ and ½ # Balls.....	18¢ 28¢
No. 204 Mattress, ¼ and ½ # Balls, 62¢54¢	
Chalk Line, Cotton, ¼ # Balls.....	25¢
Mason Line, Linen, ¼ # Balls.....	55¢
2-Ply Hemp, ¼ and ½ # Balls (Spring Twine).....	15¢5¢
3-Ply Hemp, 1 # Balls.....	16¢16½¢
3-Ply Hemp, 1½ # Balls.....	15¢15½¢
Cotton Wrapping, 5 Balls to lb.....	16¢16½¢
and 5 Ply Jute, ½ # Balls.....	15¢
Wool.....	13¢14¢
Paper.....	13¢14¢
Cotton Mops, 6, 9, 12 and 15 # to doz.....	18¢

Washers—

Size hole..... 5-16 3/4 1/2 3/8 to 1 3/4
Washers..... 5 1/2 4 1/2 3 1/2 2 1/2
In lots less than 200 lb. 5¢, add 1/4¢, 5-10
boxes 1¢ to list.

Washer Cutters—

See Cutters, Washers.

Wedges—

Iron..... 5¢ to 34¢
Steel..... 5¢ to 34¢

Weights, Sash—

Scold Eyes..... 5¢ ton \$18.00 to \$19.00

Well Buckets Galvan-

ized—See Buckets, Well, Gal-

vanized.

Wheels, Well—

8 in., \$2.25; 10 in., \$2.70; 12 in., \$3.25

Wire and Wire Goods—

Iron—

Market,
Br. & Ann., Nos. 9 to 18, 75¢ to 10¢ 75¢ to 10¢ 5¢
Cop'd, Nos. 0 to 18..... 75¢ to 5¢

Galv., Nos. 0 to 18..... 70¢ to 75¢

Tin'd, Tin'd list, Nos. 0 to 18, 70¢ to 10¢

Stone,
Br. and Ann'd, Nos. 16 to 18..... 80¢

Bright and Ann'd, Nos. 19 to 26..... 80¢ to 5¢

Br. and Ann'd, Nos. 27 to 30..... 82¢ to 5¢

Tinned.....

Tinned Broom Wire, 18 to 21..... 44¢

Galvanized Fence, Nos. 8 and 9..... 70¢ to 10¢

Brass, list Jan. 18, 1884..... 25¢ to 33¢

Copper, list Jan. 18, 1884..... 33¢ to 40¢

Annealed Wire on Spools..... 60¢

Mallin's Steel and Tin'd on Spools..... 50¢

Mallin's Brass and Cop. on Spools..... 50¢

Tate's Spooled, Tin'd & Annealed..... 50¢

Tate's Spooled Cop. and Brass..... 50¢

Cast Steel Wire..... 50¢ to 2, 30¢

Steel Music Wire, 12 to 30, imported..... 60¢ to 70¢

Wire Clothes Line, see Lines.

Wire Picture Cord, see Cord.

Bright Wire Goods—

Standard list..... 80¢ to 20¢ 85¢

Wire Cloth and Netting—

Painted Screen Cloth, good quality,
100 sq. ft., \$1.40

Galvanized Wire Netting..... 75¢ to 10¢

Wire, Barb—

See Trade Report.

Wire Rope—See Rope, Wire.**Wrenches—**

American Adjustable..... 40¢

Baxter's Adjustable "S"..... 40¢ to 50¢

Baxter's Diagonal..... 60¢

Coe's Genuine..... 50¢ to 3¢

Coe's "Mechanics"..... 50¢ to 10¢

Girard Standard..... 50¢ to 10¢

Lamson & Sessions' Engineers'..... 90¢ to 10¢

Lamson & Sessions' Standard..... 70¢ to 10¢

P. S. & W. Agricultural..... 75¢ to 10¢ to 80¢

Lamson & Sessions' Agric'l.....

Bemis & Call's:

Pat. Combination..... 35¢

Merrick's Pattern..... 35¢

Briggs' Pattern..... 25¢

Cylinder or Gas Pipe..... 40¢ to 5¢

No. 3 Pipe..... 40¢ to 10¢

Aiken's Pocket (Bright)..... \$6.00, 50¢ to 10¢

The Favorite Pocket..... \$4.00, 40¢

Webster's Pat. Combination..... 25¢

Boardman's..... 30¢

Always Ready..... 25¢ to 5¢

Alligator..... 50¢

Donohue's Engineer..... 20¢ to 10¢

Acme, Bright..... 50¢ to 2¢

Acme, Nickel'd..... 40¢ to 2¢

Hercules..... 70¢ to 75¢

Walker's..... 55¢ to 3¢

Diamond Steel..... 55¢ to 3¢

Cincinnati Brace Wrenches..... 25¢ to 10¢

Taft's Vice Wrench..... 55¢ to 10¢ to 3¢

Wringers, Clothes—

Am. Wringer Co.'s list July 1, '92, 2¢ cash

Colby Wringer Co., list Sept. 1, '91, 2¢ cash

Lowell Mfg. Co., list Jan. 1, 1892, 2¢ cash

Peerless Mfg. Co., list Feb., 1892, 2¢ cash

National Wringer & Mfg. Co., list

June 1, 1892..... 2¢ cash

Wrought Goods—

Staples, Hooks, &c., list March 17, 1892

85¢ to 10¢ to 85¢ to 20¢

Paints, Oils and Colors.—Wholesale Prices.

Animal and Vegetable**Oils—**

Linseed, City, raw, per gal. 40

Linseed, City, boiled..... 40

Linseed, Western, raw..... 40

Lard, City, Extra Winter..... 78

Lard, City, Prime..... 77

Lard, City, Extra No. 1..... 77

Lard, City, No. 1..... 77

Lard, Western, prime..... 76

Cotton-seed, Crude, prime..... 28

Cotton-seed, Crude, off

grades..... 20 1/2 to 27 1/2

Cotton-seed, Summer Yel-

low, prime..... 32

Cotton-seed, Summer Yel-

low, off grades..... 30

Sperm, Crude..... 68

Sperm, Natural Spring..... 67

Sperm, Bleached Spring..... 72

Sperm, Natural Winter..... 73

Sperm, Bleached Winter..... 73

Whale, Crude..... 43

Whale, Natural Winter..... 52

Whale, Bleached Winter..... 55

Whale, Extra Bleached..... 57

Sea Elephant, Bleached

Winter.....

Menhaden, Crude, Sound..... 33

Menhaden, Crude, Southern

Menhaden, Light Pressed..... 37

Menhaden, Bleached W'ter

Menhaden, Extra Bleached..... 42

Tallow, City, prime..... 45

Tallow, Western, prime..... 45

Cocoanut, Ceylon..... 5 1/2 to 6 1/4

Cod, Domestic..... 38

Cod, Foreign..... 42

Red Elaine..... 36

Red Saponified..... 4 1/2 to 5

Bank..... 35

Straits..... 36

Olive, Italian, bbis..... 64

Neatsfoot, prime..... 50

Palm, foot, Lagos..... 5 1/2 to 6 1/4

Mineral Oils—

Black, 29 gravity, 25 @ 30

cold test..... 7 @ 7 1/2

Black, 29 gravity, 15 cold

test..... 7 1/2 @ 8

Black, 29 gravity, summer..... 6 @ 6 1/4

Cylinder, light, filtered..... 14 @ 16

Paints and Colors—

Barytes, Foreign, 10 ton, \$22.00 @ 24.00

Barytes, Amer. floated..... 20.00 @ 22.00

Barytes, Amer. No. 1..... 16.00 @ 18.00

Barytes, Amer. No. 2..... 13.00 @ 15.00

Barytes, Amer. No. 3..... 11.00 @ 12.00

Blue, Celestial..... 6 @ 5

Blue, Chinese..... 25 @ 40

Blue, Prussian..... 8 @ 25

Blue, Ultramarine..... 1 1/2 @ 1

Brown, Spanish..... 3 @ 3 1/2

Brown, Vandyke, Amer..... 6 @ 8

Brown, Vandyke, English..... 3 @ 4

Carmine, No. 40, in bulk..... 3.10 @

Carmine, No. 40, in boxes

or barrels..... 3.20 @

Carmine, No. 40, in ounce

bottles..... 4.20 @

Chalk, in bulk..... 1 ton..... @ 1.75

Chalk, in bbis., 100 lb..... 33 @ 40

China Clay, English..... 13.00 @ 18.00

Cobalt Oxide, prep'd..... 9.00 @ 11.00

Cobalt Oxide, black.....

lots 100 lb. 1.90 @

Cobalt Oxide, black.....

less 100 lb. 1.90 @

Green, Paris, in bulk..... 13 @ 15 1/2

Green, Paris, 170 @ 175 lb

kegs..... 14 @ 16

Green, Paris, small pack..... 15 1/2 @ 22

Green, Chrome, ordinary..... 6 @ 12

Green, Chrome, pure..... 22 @ 25

Lead, Eng., B.R. white..... 8 1/2 @ 10

Lead, Amer. White, dry or in oil:

Kegs, lots less than 500 lb..... 7 1/4 @ 7 1/2

Kegs, lots 500 lb to 5 tons..... 6 1/2 @ 7

Kegs, lots 5 tons to 12 tons..... 6 1/4 @ 6 1/2

Kegs, lots 12 tons and over..... 6 1/4 @ 6 1/2

Lead, White, in oil, 25 lb tin

pails, add to keg price..... @ 1 1/2

Lead, White, in oil, 12 1/2 lb tin

pails, add to keg price..... @ 1

Lead, White, in oil, 1 to 5 lb as-

sorted tins, add to keg price..... @ 1 1/2

Lead, Red, bbis. and 1/2 bbis..... 6 1/4 @ 7 1/2

Lead, Red, kegs..... 6 1/4 @ 7 1/2

Litharge, kegs..... 6 1/4 @ 7 1/2

Litharge, bbis. and 1/2 bbis..... 6 1/4 @ 7 1/2

TERMS, &c.—Lead and Litharge.—On

lots of 500 lb or over, 60 days' time or 2 1/2

% discount for cash if paid within 15 days

of date of invoice.

Ocher, Rochelle..... 1.35 @ 1 1/2

Ocher, French Washed..... 1 1/2 @ 2 1/2

Ocher, German Washed..... 1 1/2 @ 3

Ocher, American..... 1 1/2 @ 1 1/2

Orange Mineral, English..... 8 1/2 @ 9

Orange Mineral, French..... 10 @ 10 1/2

Orange Mineral, German..... 8 1/2 @ 9

Orange Mineral, American..... 8 1/2 @ 8 1/2

Paris White, English Cliff

stone..... 1.00 @ 1.15

Paris White, American..... 55 @ 75

Red, Indian, English..... 5 1/2 @ 7

Red, Indian, American..... 2 @ 4 1/2

Red, Turkey..... 9 @ 14

Red, Tuscan..... 9 @ 11

Red, Venetian, American.....

100 lb..... 1.00 @ 1.10

Red, Venetian, English..... 1.20 @ 1.35

Sienna, Italian, Burnt and

Powd., 100 lb..... 4 @ 5

Sienna, Ital., Burnt Lumps..... 1 1/2 @ 3 1/2

Sienna, Ital., Raw, Powd..... 4 1/2 @ 5 1/2

Sienna, Ital., Raw, Lumps..... 1 1/2 @ 3 1/2

Sienna, American, Raw..... 1 1/2 @ 1 1/2

Powdered..... 1 1/2 @ 1 1/2

Talc, French..... 1 1/2 @ 1 1/2

Talc, American..... 1 1/2 @ 1 1/2

Terra Alba, Frch., 100 lb..... 95 @ 125

Terra Alba, English..... 70 @ 80

Terra Alba, American No. 1..... 65 @ 75

Terra Alba, American No. 2..... 45 @ 50

Umber, Turkey, Burnt and

Powdered..... 3 1/2 @ 4

Umber, Turkey, Bnt. Ln..... 2 1/2 @ 3

Umber, Turkey, Raw and

Powdered..... 3 1/2 @

Umber, Turkey, R'w Lumps..... 2 1/2 @ 2 1/2

Umber, Turkey, Bnt. Amer..... 1 1/2 @ 1 1/2

Umber, Turkey, R'w Amer..... 1 1/2 @ 1 1/2

Yellow, Chrome..... 10 @ 25

Vermillion, American Lead..... 11 1/2 @ 12

Vermillion, Quicksilver, bulk..... 57 @

Vermillion, Quicksilver, bags..... 58 @

Vermillion, Quicksilver sm'r

pkgs..... 62 @

Vermillion, English Import..... 85 @ 90

Vermillion, Imitation, Eng..... 8 @ 35

Vermillion, Trieste..... 90 @ 92 1/2

Vermillion, Chinese..... 92 1/2 @ 95

Whiting Common, 100 lb..... 37 1/2 @ 42 1/2

Whiting Gilders..... 45 @ 55

Zinc, American, dry..... 5 1/2 @ 5

Zinc, French, Red Seal..... 7 1/2 @

Zinc, Fre ch, Green Seal..... 9 @

